06.11- 7/1/2000-02590

SITE SPECIFIC HEALTH AND SAFETY PLAN
FOR
THE INSTALLATION OF FIRE TRAINING UNITS AT SITES 9 AND 54 MCB CAMP LEJEUNE, NORTH CAROLINA

Prepared for:

DEPARTMENT OF THE NAVY
Contract No. N62470-97D-5000
Task Order 022

Submitted by:

OHM Remediation Services Corp.
200 Horizon Center Boulevard
Trenton, New Jersey 08691-1904

Prepared by:

Alison Harwood

Alison Harwood, ASP
Health and Safety Coordinator

Reviewed by:

Alison Harwood for

Robert A. Brooks, CSP
Health and Safety Coordinator

July 2000
OHM Project No. 776506

OHM Remediation Services Corp.
A Subsidiary of the IT Group

TABLE OF CONTENTS

APPENDICES

A. Material Safety Data Sheets
B. Site Specific Health and Safety Procedures
C. Safety Plan Acknowledgement
D. Job Safety Analyses

1.0 SITE HISTORY/SCOPE OF WORK

1.1 SITE HISTORY/BACKGROUND

Site 89 the Defense Reutilization and Marketing Office (DRMO) and is located near the inter section of "G" and Eighth Streets is the Fire Fighting Training Pit at Piney Green Road. Site 9 has been used as a fire fighting training area from the early 1960's, when the extinguishing activities took place in an unlined pit. In 1981, the pit was lined with asphalt.

Site 54 is the Crash Crew Fire Training Burn Pit, located near the end of runway 5-23. It served as the location for the MCAS fire training exercises since the mid-1950's. Excessive fuels, oils and solvents were used to simulate fire conditions that would result from aircraft crashes. The fire training exercises were originally conducted on the ground surface, within a bermed area. A lined burn pit was constructed in 1975, which is the burn pit that remains in operation at Site 54 presently. Only JP-type fuels are used during the current training exercises.

1.2 SCOPE OF WORK

This Health and Safety Plan focuses on the removal of the existing burn pit sites and the installation and start-up of the new fire training units.

The principal tasks to be conducted are listed below:

- Mobilization/Site Setup
- Security fence installation
- Excavation of the existing burn pits
- Confirmatory sampling
- Soil loadout and disposal
- Decontaminate equipment
- Installation and Start-up of the Rescue and Live Fire Training Unit (FCR/LFTU)
- Underground Storage Tank (UST) Removal

These activities have been analyzed for potential hazards for which control measures are provided in Appendix E Job Safety Analysis.

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Site Supervisor (SS), Health and Safety Manager (HSM), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and for implementing this HASP. The supervisor's and employee safety responsibilities are detailed in SOP's 1-6 and 1-7. The following summarizes the health and safety responsibilities of the site management.

2.1 PROJECT SAFETY RESPONSIBILITIES

The PM has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SS and the SSO to assure that the work is completed in a manner consistent with the HASP. The SS is responsible for field implementation of the HASP. The SS will be the main contact in any on-site emergency situation and will insure off-site emergency agencies have been contacted prior to the start of work. The SS will act as the SSO when the assigned SSO is not on the project site. The SSO is authorized to administer this HASP. The SSO is authorized to stop work when an imminent health or safety risk exists. The CIH and/or HSM are responsible for reviewing the HASP and ensuring that the HASP is complete and accurate. The CIH and/or HSM also provide technical and administrative support for the Health and Safety Program and will be available for consultation when required. Each employee is responsible for personal safety as well as the safety of others in the work area.

2.2 KEY SAFETY PERSONNEL

The following individuals share responsibility for health and safety at the site:

Project Manager	Jim Dunn (770) 663-1433 (office)
Site Supervisor	Randy Smith (910) 389-4345 (cellular)
Site Safety Officer	Dale Saurers (910) 451-2390 (site phone)
Certified Industrial Hygienist	Paul Lawless, CIH 609-588-6391 (office)

Health and Safety Manager	Robert Brooks, CSP (732) 469-5599 (office)
Vice President, Health & Safety	Warren Houseman, CIH (412) 858-3741 (office)

3.0 JOB SAFETY ANALYSIS

This section outlines the potential chemical and physical hazards, which workers may be to during work at the OHM project sites 9 and 54. Table 3.1 lists the contaminants, which may be at the sites. A list of chemicals, which may be brought to the site for which an MSDS is necessary, is included in Appendix A.

3.1 CHEMICAL HAZARDS

Work at sites 9 and 54 may result in exposure to Bis (2-Ethyhexyl) phthalate, Chromium, Diesel, Ethylbenzene, Lead, Methylnaphthalene, Petroleum Hydrocarbons, Naphthalene, Toluene, and Xylenes from the excavation of soils.

CHEMICAL	EXPOSURE ROUTES	PEL/TLV	HEALTH HAZARDS/ PHYSICAL HAZARDS
Bis (2-Ethylhexyl) phthalate	Skin,eye, Inhalation, Ingestion	5.0 mg/m3	• An irritant to eyes, skin, mucous membranes, and respiratory tract; ingestion; nausea, abdominal cramps diarrhea • Reacts with strong oxidizers; combustible liquids; toxic bi-products of combustion
Chromium	Skin,eye, Inhalation, Ingestion	0.5 mg/m3 Cr (VI) Soluble 0.005 mg/m3 Insoluble 0.001 mg/m3	• Some Chromium (VI) compounds are confirmed human carcinogens; corrosive irritant to the skin, eyes, respiratory tract; deep skin ulcers; not (always) immediately painful; an allergic sensitizer; 5 grams ingested can be fatal • Reacts with strong oxidizers, alkalis, can react with, ignite oils grease, paper and plastics
Diesel Fuel	Skin, eye, inhalation, ingestion	ND	• Ingestion causes nausea, vomiting and cramps; CNS depression, headache, coma, death. Inhalation causes pulmonary irritation, lightheadedness. Aspiration causes severe lung irritation and coughing. Irritant to the skin and mucus membranes. • Incompatible with strong oxidizing agents; heating greatly increases the fire hazard.
Ethylbenzene	Skin,eye, Inhalation, Ingestion	100 ppm STEL 125 ppm	• A strong eye, skin mucous membrane irritant; dermatitis, headache, dizziness, sleepiness, narcosis, coma, CNS depression • Reacts with strong oxidizers, flammable liquid, releases toxic gases during combustion

CHEMICAL	EXPOSURE ROUTES	PEL/TLV	HEALTH HAZARDS/ PHYSICAL HAZARDS
Lead	Inhalation, Ingestion	0.05mg/m3	• Weakness, insomnia; loss of appetite, loss of weight, abdominal pain; anemia; tremors; weakness of wrists/ankles; kidney damage; low blood pressure • Incompatible with strong oxidizers, hydrogen peroxide acid and acids
Petroleum Hydrocarbons	Skin, eye, inhalation, ingestion	300 ppm	• Gasoline mixtures contain probable human carcinogens (benzene and toluene); a skin, sys, respiratory, mucus membrane irritant; headache, dizziness, nausea, staggering, unconsciousness, convulsions, chemical pneumonia, liver and kidney damage. • A flammable liquid, explosive vapors can flash back to fuel source; reacts violently with oxidizers, peroxides nitric acid, and perchlorates.
Methyl naphthalene	Skin,eye, Inhalation, Ingestion	N/E	• Askin irritant • Reacts with acids and oxidizers; emits acrid smoke and irritating fumes
Naphthalene	Skin,eye, Inhalation, Ingestion	10 ppm PEL 15 ppm STEL	• Over exposure may cause headache, nausea, diaphoresis hematuria, fever, anemia, liver damage, vomiting, convulsions and coma Flammable when exposed to heat or flame, reacts with oxidizing materials. Reacts violently with CrO, aluminum chloride + benzoyl chloride
Toluene	Skin,eye, Inhalation, Ingestion	50 ppm skin	• Fatigue, weakness, confusion, euphoria, dizziness, headache, dilated pupils, insomnia, numbness/tingling in the hands, feet dermatitis • Reacts with strong oxidizers; flammable liquid; releases toxic gases during combustion
Xylenes	Skin,eye, Inhalation, Ingestion	100 ppm	• Dizziness, excitement, drowsiness, incoherent, stagger walk; eye, nose, throat irritation; nausea, vomiting, dermatitis • Flammable; reacts with strong oxidizers

The following general symptoms may indicate exposure to a hazardous chemical. Personnel will be removed from the work site and provided immediate medical attention if the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria

- Chest pains and coughing
- Rashes or burns

3.2 HAZARD COMMUNICATION

The purpose of hazard communication (Employee Right-to-Know) is to ensure that the hazards of all chemicals located at this field project site are transmitted (communicated) according to 29 CFR 1926.59 to all OHM personnel and OHM subcontractors. Hazard communication will include the following:

3.2.1 Container Labeling

OHM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on site by operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party

3.2.2 Material Safety Data Sheets (MSDSs)

There will be an MSDS located on site for each hazardous chemical known to be used on site. All hazardous chemical MSDSs will be located in Appendix A of the SHSP. The site safety plan can be found in the project office trailer.

3.2.3 Employee Information and Training

Training employees on chemical hazards is accomplished through on ongoing corporate training program. Additionally, chemical hazards are communicated to employees through daily safety meetings held at OHM field projects and by an initial site orientation program.

At a minimum, OHM and related subcontractor employees will be instructed on the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- What the company has done to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals.
- How to read and interpret labels and MSDSs for hazardous substances found on OHM sites

- Emergency spill procedures
- Proper storage and labeling

Before any new hazardous chemical is introduced on site, each OHM and related subcontractor employee will be given information in the same manner as during the safety class. The site supervisor will be responsible for seeing that the MSDS on the new chemical is available for review by on site personnel. The information pertinent to the chemical hazards will be communicated to project personnel.

Morning safety meetings will be held and the hazardous materials used on site will be discussed. Attendance is mandatory for all on site employees.

Refer to Appendix A of the site safety plan to find a list of hazardous chemicals anticipated to be brought to the site and the corresponding MSDSs for these chemicals

3.3 PHYSICAL HAZARDS

To minimize physical hazards, OHM has developed standard safety protocols that will be followed at all times. Failure to follow safety protocols will result in removal of an employee from the site and appropriate disciplinary actions.

The SS and SSO will observe the general work practices of each crew member and equipment operator, and enforce safe procedures. The crew leaders, SS and SSO will inspect Work areas. All hazards will be corrected in a timely manner. A variety of physical hazards may be encountered during work activities at this site. Job Safety Analyses will be developed for each principal activity and will identify all major hazards to which employees may be exposed. Hard hats, safety glasses, and steel-toe safety boots are required in all areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. **The LANTDIV Health and Safety Procedures Manual will be maintained at the project site as a reference document.**

Physical hazards include safety and environmental hazards. The following physical hazards may be present during project activities:

- Heat stress
- Water hazards
- Biological hazards (Poison Ivy ,Ticks, Lyme's Disease)
- Manual lifting/back strain

- Noise
- Fire, Explosion
- Vehicle Traffic

Heat stress Prevention procedures will be implemented according to SOP 3-4. Cold stress Prevention procedures will be implemented according to SOP 3-5. Personal noise exposures will be controlled by instituting the Hearing Conservation Program, according to SOP 3-3.

3.4 JOB SAFETY ANALYSES

Appendix E contains Job Safety Analyses (JSA) for primary site tasks. These JSA's are general in nature and must be made project specific by the Site Supervisor prior to each task. They contain detailed information on physical and chemical hazards, and provide control measures for these hazards. The JSA's will be field checked by the SS on an ongoing basis and revised as necessary. All revisions will be communicated to the work crew.

4.0 WORK AND SUPPORT AREAS

To prevent migration of contamination from personnel and equipment, work areas will be clearly specified as designated below prior to beginning operations. Each work area will be classified in accordance with NIOSH/OSHA/USCG/EPA'S document *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*. Each work area will be clearly identified using signs or physical barriers. The following work zones will be established according to SOP 5-3 and will be delineated on the site map:

- Exclusion Zone
- Contamination Reduction Zone
- Support Zone

A log of all personnel visiting, entering or working on the site shall be maintained in the main office trailer location. No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e), (f). Visitors will attend a site orientation given by the SSO and sign the HASP.

The following are standard safe work practices that apply to all site personnel and will be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, smoking is prohibited in the EZ/CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco and smoking.
- A buddy system will be used. Hand signals will be established to maintain communication.
- All personnel working in the water will wear life vests.
- During site operations, each worker will consider himself as a safety backup to his partner. Off-site personnel provide emergency assistance.
- Visual contact will be maintained between buddies on site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established by the SSO or the SS, will be immediately dismissed from the site.

- Proper decontamination procedures must be followed before leaving the site.
- All employees and visitors must sign in and out of the site.

5.0 PROTECTIVE EQUIPMENT

This section specifies the levels of personal protective equipment (PPE) which are or may be required for each principal activity performed at this site. All site personnel must be trained in the use of all PPE utilized. The PPE program contained in SOP 4-1 will be applied to project activities. The use and maintenance of respiratory protection is specified in SOP 4-2.

5.1 ANTICIPATED PROTECTION LEVELS

The following protection levels have been established for the site work activities based on the information provided by LANTDIV, concerning the levels of site contaminants and the scope of work. Results of site air monitoring and visual inspection of the work activities may indicate the need for changes in PPE level(s).

Task	Initial PPE Level	Upgrade PPE Level	Skin Protection	Respiratory Protection	Other PPE
Site Setup, Security fence installation, Installation, and Start up of the FCR/LFTU)	Level D	None	Generally none; Some clearing activities may require Tyvek coveralls to prevent insect bites/contact with poisonous plants	Initial: None Upgrade: If creosote is present above the action level : Full face air purifying respirator	Hard-hat, Steel-toe work boots, goggles/face shield, latex gloves, latex boots and hearing protection >85 dBA
Excavation of existing burn pits, Sampling, UST removal, Soil loadout and disposal	Level D+	Level C	Tyvek coveralls,	Initial: None Upgrade: Full-face air purifying respirator	Hard-hat, Steel-toe work boots, latex gloves, latex boots and hearing protection >85 dBA
Decontaminate equipment	Level D+	None	PVC rain suit or Tyvek coveralls	None	Hard-hat, Steel-toe work boots, latex gloves, latex boots and hearing protection >85 dBA
General SZ Activities	Level D	---	None	None	Hard-hat, Steel-toe work boots, Safety glasses

5.2 PROTECTION LEVEL DESCRIPTIONS

This section lists the minimum requirements for each protection level. Modification to these requirements may have been noted above.

5.2.1 Level D

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather

5.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC overboots
- Outer nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)
- Life vests
- Rain gear if necessary

5.2.3 Level C

Level C consists of the following:

- Full-face, air-purifying respirator with appropriate cartridges
- Hooded Tyvek Coveralls
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, latex or PVC overboots
- Nitrile, neoprene, or PVC gloves over latex sample gloves
- Face shield (when projectiles or splashes pose a hazard)

5.3 AIR PURIFYING RESPIRATORS

A NIOSH approved full-face respirator with appropriate air purifying cartridges will be used for level C work. The crew members working in Level C will wear respirators equipped with air-purifying cartridges approved for: organic vapors <1,000 ppm; chlorine gas 10 ppm; hydrogen chloride <50 ppm; sulfur dioxide <50 ppm; dusts, fumes and mists with a TWA <0.05 mg/m^3 ; asbestos-containing dusts and mists and radionuclides.

6.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

6.1 PERSONNEL DECONTAMINATION

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedure. The specific stages will vary depending on the site, the task, the protection level, etc.

6.1.1 Level D+ Decontamination

1. Go to end of EZ
2. Remove and discard latex booties
3. Remove outer gloves and discard
4. Cross into CRZ (dirty side of respirator wash area)
5. Remove protective suit (polycoated/regular tyvek)
6. Remove inner sample gloves and discard
7. Wash face and hands

6.1.2 Level C Decontamination

Go to end of EZ

2. Wash outer boots (Tingley or Robars) and stage to let dry; or

b. Remove and discard latex booties

3. Remove outer gloves and discard
4. Remove outer suit (Saranex/polycoated/regular Tyvek)
5. Remove outer sample gloves and discard
6. Cross into CRZ (dirty side of respirator wash area)
7. Remove inner suit and discard, (if applicable)
8. Remove and wash respirator (4 stages)
   a. Soap and water solution
   b. First rinse
   c. Disinfect respirator (1 cap full of bleach to 1 gallon of water)
   d. Final rinse
   e. Hang respirator to dry
   f. Remove inner sample gloves and discard

g. Wash face and hands

6.1.3 Suspected Contamination

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination facility. Here the worker will remove clothing, shower, don clean clothing, and immediately be taken to the first-aid station. Medical attention will be provided at determined by the degree of injury

6.1.4 Personal Hygiene

Before any eating, smoking, or drinking, personnel will wash hands, arms, neck and face.

6.2 EQUIPMENT DECONTAMINATION

All contaminated equipment will be decontaminated before leaving the site. Decontamination procedures will vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steaming the exterior of the equipment. Personnel performing this task will wear the proper PPE as prescribed by the SSO.

6.3 DISPOSAL

All decontamination liquids and disposable clothing will be treated as contaminated waste only if creosote is visually identified on the pilings. Wastes will be disposed of according to state and federal regulations.

7.0 AIR MONITORING

Air monitoring will be conducted in order to characterize personnel exposures and fugitive emissions from site contaminants. Principal contaminants of concern are listed in Section 3.0 of this HASP. The target compound selected for air monitoring purposes for this site may be Bis (2-Ethyhexyl) phthalate, Chromium, Diesel, Ethylbenzene, Lead, Petroleum Hydrocarbons, Methylnaphthalene, Naphthalene, Toluene, and Xylenes. Results of air monitoring will be used to ensure the proper selection of protective clothing and equipment, including respiratory protection, to protect on-site personnel and off-site receptors from exposure to unacceptable levels of site contaminants. Descriptions of air monitoring strategies, procedures and equipment are provided below. Modification of this plan, including additional monitoring, may be considered as judged necessary by the CIH, in conjunction with the HSM and SSO.

7.1 WORK AREA AIR MONITORING

Work area air monitoring for the sampling activities at Site 9 and Site 54 will include direct reading methods. Air monitoring will be conducted during the cutting of the pilings if creosote is visually identified.

7.1.1 Direct Reading Air Monitoring

A Mini Ram will be used to monitor for air borne particulates and a PID will be used for airborne volatile organics. A summary of air monitoring information is provided in the table below.

Monitoring Device	Monitoring Location/ Personnel	Monitoring Frequency	Action Level	Action
Mini Ram	Recovery Technician (RT)	Periodic (Minimum 4 times per day for five minutes) cutting operations	<5.0 mg/m3	Level D
			5.0-50.0 mg/m3	Level C
			50.0-50,000 mg/m3	Level B
PID	EZ Excavation/ staging area Equipment Operator (EO), Recovery Technician (RT)	Periodic during excavation, transportation and staging activities	<10.0 ppm*	Level D
			10.0-100 ppm	Level C
			100-100,000 ppm*	Level B

Monitoring Device	Monitoring Location/ Personnel	Monitoring Frequency	Action Level	Action
LEL/O_2	Test tank prior to cutting	Initially prior to cutting tank	>10% LEL <20.8% O_2 or 23.5% O2	Inert Tank

*Sustained levels above background for 5 minutes

7.2 INSTRUMENTATION

The following is a description of the air monitoring equipment to be used at this site.

7.2.1 Real-Time Aerosol Monitor (Mini Ram Model PDM-3 and Model Pr 100 Data Ram)

7.2.1.1 Principle of Operation

Detection of light in the near infrared region back-scattered to a sensor (photovoltaic detector) by airborne particulate in a sensing volume

The higher the dust concentration the more back-scattering of light to the sensor, resulting in increased readings

Device calibrated at the factory against an air sampling filter/gravimetric analysis reference method

7.2.1.2 Calibration Methods/Frequencies

There is no calibration method or procedure for calibrating the mini-ram monitor. However, it is recommended that the mini-ram monitor be re-zeroed once a week. During a zero check, the sampled air passes through the purge air filter and dryer to effect a self-cleaning of the optical chamber.

7.2.1.3 Preventative Maintenance

Maintenance of the mini-ran consists of replacement of filters and desiccant; battery replacement; and cleaning of the optical detection assembly.

7.2.2 Photoionization Detector (PID)

7.2.2.1 Type and Operational Aspect

PID Model PI 101 or equivalent

- Principle of Operation

  Ionization potential (IP) - The energy required to remove the outermost electron from a molecule; measured in electron volts (eV); characteristic property of a specific chemical.

  Photoionization - Using ultraviolet (UV) light to remove the outermost electron from a molecule.

  Energy of UV light (10.2, 9.5, 11.7 eV) must be equal to or greater than the IP to photoionize the molecule.

  Fan or pump is used to draw air into the detector where the contaminants are exposed to a UV light source (lamp).

  Ions are collected on a charged plate and produce a current directly proportional to the number of ionized molecules; current is amplified and displayed on the meter.

7.2.2.2 Calibration Methods/Frequencies

The PID Model PI 101 is designed for trace gas analysis in ambient air and is calibrated at HNU with certified standards of benzene, vinyl chloride, and isobutylene. Other optional calibrations are available (e.g., ammonia, ethylene oxide, H_2S, etc.).

OHM will use a PID with a 10.2 eV lamp. This lamp has been determined to be most responsive to the contaminants on site. Optional probes containing lamps of 9.5 and 11.7 EV are interchangeable in use within individual read-out assemblies for different applications.

The approximate span settings for the probe that would give different readings of the amounts of trace gas of a particular species in a sample are based upon the relative photoionization sensitivities of various gases twice daily (beginning and end of shift).

It is recommended that calibration be checked twice each day (beginning and end of shift). The SSO will record and log such calibration information into an air monitoring notebook.

7.2.2.3 Preventative Maintenance

Maintenance of the PID Model PI 101 consists of cleaning the lamp and ion chamber, and replacement of the lamp or other component parts or sub-assemblies.

7.2.2.4 Lower Explosive Limit/Oxygen)LEL/O_2) Meter

Types and Operational Aspects

MSA Watchman LEL/O2 Meter or equivalent

Principle of Operation

- Oxygen detector uses an electrochemical sensor; produces a minute electric current proportional to the oxygen content.
- Combustible gas indicators use a combustion chamber containing a filament that ignites flammable vapors; filament is heated or coated with a catalyst (platinum) to facilitate combustion.
- Filament is part of a balanced resistor circuit; combustion in the chamber causes the filament temperature to increase; results in increased filament resistance.
- Change in the filament's resistance causes an imbalance in the circuit proportional to the percent of the lower explosive limit (% LEL).
- Concentrations greater than the LEL and lower than the upper explosive limit (UEL) will read 100% LEL; combustible atmosphere present.
- Concentrations greater than the UEL will read above 100% LEL then return to zero. (NOTE: Some devices have catchment mechanisms which will cause the needle to remain at 100% until the meter is reset.) This type of response indicates the gas mixture is too rich to burn and is not combustible. The danger is that the addition of air to the gas mixture could bring it into the flammable range (less than the UEL).
- Oxygen meter set at the factory to alarm at 19.5% (oxygen deficient atmosphere) combustible gas meter set by the user to alarm at 10% LEL.

Calibration Methods/Frequencies

Before the calibration of the combustible gas indicator can be checked, the unit must be in operating condition. The combustible gas indicator (LEL) is normally calibrated on pentane as being representative of the flammability characteristics of most commonly encountered combustible gases. The meter scale is calibrated from zero to 100% LEL, which corresponds in actual volume concentrations of 0 to approximately 14% pentane in air. A booklet of response curves is supplied with the Watchman Meter. These curves may be used to interpret meter readings when sampling combustible gases other than pentane.

It is recommended that calibration be checked before and after using each time. The PSO will record and log such calibration information into an air monitoring notebook. The O_2 meter is calibrated by adjusting the O_2 control knob to 20.8% while the meter is operated in a fresh air atmosphere.

Preventative Maintenance

The primary maintenance of unit is the rechargeable 2.4 volt nickel cadmium battery. Recommended charging time is 16 hours. It may be left on charge for longer periods without damaging the battery. The battery sometimes will not supply full power capacity after repeated partial use between charging. Therefore, it is recommended that the battery be exercised at least once a month by running for eight to 10 hours and recharged. If the instrument has not been used for 30 days, the battery should be charged prior to use.

HYDROGEN CYANIDE MONITOR

Hydrogen cyanide (HCN) monitors are required to measure personnel breathing zones when site personnel are potentially exposed to HCN during site remedial operations. An action level of 5 ppm for 5 minutes requires an upgrade to Level B protection because air purifying respirators are not appropriate for HCN exposures. An HCN action level of 25 ppm for 5 minutes requires operations to be shut down until HCN vapors vent to less than 25 ppm. The 25 ppm HCN action level represents 50 percent of the published "Immediately Dangerous to Life and Health" (IDLH) atmosphere for HCN.

7.3 AIR MONITORING

The SSO will ensure that all air-monitoring data is logged into a monitoring notebook. Data will include instrument used, wind direction, work process, etc. The OHM CIH and/or HSM may periodically review this data.

7.4 CALIBRATION REQUIREMENTS

The Mini-Ram will be calibrated daily before and after use. A separate log will be kept detailing date, time, span gas, or other standard, and name of person performing the calibration.

7.5 AIR MONITORING RESULTS

Air monitoring results will be posted for personnel inspection, and will be discussed during morning safety meetings. Personal air sampling results will be forwarded to the IT/OHM Corporate Health and Safety Manager for Medical Surveillance, to be incorporated into the employee(s)' medical records.

8.0 EMERGENCY RESPONSE

8.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the site, OHM will plan for possible emergency situations and have available adequate supplies and manpower to respond. In addition site personnel will receive training during the site orientation concerning proper emergency response procedures.

The following situations would warrant implementation of the Emergency Response and Contingency Plan (ERCP):

Fire/Explosion	• The potential for human injury exists. • Toxic fumes or vapors are released. • The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions. • The use of water and/or chemical fire suppressants could result in contaminated run-off. • An imminent danger of explosion exists.
Spill or Release of Hazardous Materials	• The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard. • The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health.
Spill or Release of High Temperature Liquid or Vapor	• The spill can be contained on site, but the potential exists for groundwater contamination. • The spill cannot be contained on site, resulting in off-site soil contamination and/or ground water or surface water pollution. • The spill quantity is greater than the reportable quantity limit for the material.
Natural Disaster	• A rainstorm exceeds the flash flood level. • The facility is in a projected tornado path or a tornado has damaged facility property. • Severe wind gusts are forecasted or have occurred and have caused damage to the facility.
Medical Emergency	• Overexposure to hazardous materials. • Trauma injuries (broken bones, severe lacerations/bleeding, burns). • Eye/skin contact with hazardous materials. • Loss of consciousness. • Heat stress (Heat stroke). • Cold stress (Hypothermia). • Heart attack. • Respiratory failure. • Allergic reaction.

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.
- On-site emergency responders will be current in regards to training and medical surveillance programs. Copies of all applicable certificates will be kept on file for on-site personnel required to respond.
- It will be the responsibility of the emergency coordinator to brief the on-site response team on anticipated hazards at the site. The emergency coordinator shall also be responsible for anticipating and requesting equipment that will be needed for response activities.
- Emergency response activities will be coordinated with the Local Emergency Management Agency (EMA) in compliance with SARA Title III requirements.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. The primary communication device will be two-way radios. Air horns may be used to alert personnel of emergency conditions. A telephone will be located at the command post to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

8.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the Site Supervisor and Site Safety Officer (SSO), through daily site inspections and employee feedback (Safety Observation Program, daily safety meetings, and job safety analyses) to recognize and identify all hazards that are found at the site. These may include:

Chemical Hazards	• Materials at the site • Materials brought to the site
Physical Hazards	• Fire/explosion • Slip/trip/fall • Electrocution • Confined space • IDLH atmospheres • Excessive noise
Mechanical Hazards	• Heavy equipment • Stored energy system • Pinch points • Electrical equipment • Vehicle traffic
Environmental Hazards	• Electrical Storms • High winds • Heavy Rain/Snow • Temperature Extremes (Heat/Cold Stress) • Poisonous Plants/Animals

Once a hazard has been recognized, the Site Supervisor and/or the SSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Lock-out/tag-out
- Personal Protective Equipment (PPE) selection/use
- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all OHM standard operating procedures
- Practice drills for fire, medical emergency, and hazardous substances spills

TABLE 8.1 EMERGENCY TELEPHONE NUMBERS	
Local Agencies –	
Ambulance	
Fire	911 or (910) 451-3855 (off base)
Police	911 911 or (910) 455-9119 (off base)
Hospital -	
Onslow County Memorial Hospital (off base)	(910) 577-2240 (off-base)
USMC Base Hospital (on base)	(910) 450-4840 (on base)
Regional Poison Control Center	800-672-1697
State Agencies	
State Highway Partol	800-441-6127
Federal Agencies	
Agency for Toxic Substances and Disease Registry	(404) 639-0615 (24 hr.)
EPA Region Branch Response Center	(404) 347-3931
National Response Center	800-424-8802
ROICC - Brent Rowse	(910) 451-2581 (office)
OHM Personnel	
Project Manager – James Dunn	(770) 663-1433 (office) (800) 999-6710 PIN 996-8061
Site Supervisor – Randy Smith	(910) 389-4345 (cellular) (910) 364-7110 (pager)
Site Health and Safety Officer – Mark Martin	(910) 451-2390 (site phone) (910) 346-7112 (pager)
Health and Safety Coordinator – Alison Harwood	(770) 663-1428 (office) (678) 575-0385 (cellular)
Health & Safety Manger - Bob Brooks	(732) 469-5599 (office)
OHM Corporation (24 hour)	800-537-9540
Additional Phone #'s in Section 3 this HASP	

8.3 PERSONNEL ROLES, LINES OF AUTHORITY, AN COMMUNICATION

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this site is the Site Supervisor. In the event an emergency occurs and the emergency coordinator is not on site, the Site Safety Officer or the highest-ranking employee on site will serve as the emergency coordinator until he/she arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment. Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

8.3.1 Responsibilities and Duties

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. OHM will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required. OHM will defer to the local Fire Department chief to assume the role of Incident Commander upon arriving on site. Additional on-site personnel may be added to the Site Emergency Response Team as required to respond effectively.

8.3.2 On-Site Emergency Coordinator Duties

The on-site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.
- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site. While operations are dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where appropriate.
- Notify local Emergency Response Teams if their help is necessary to control the incident. Table 8.1 provides telephone numbers for emergency assistance.
- Direct on-site personnel to control the incident until, if necessary, outside help arrives.
- Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if appropriate. The Emergency Response Team is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.
- If fire or explosion is involved, notify facility Fire Department.

- Notify Client Representative
- Notify OHM Project Manager
- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the site, the emergency coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required, notify the National Response Center. The following information should be provided to the National Response Center:

- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.
- Record time, date, and details of the incident, and submit a written report to the USEPA Regional Administrator. Report is due to USEPA within 15 days of the incident.

8.4 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the SS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies that could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent

of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

In the event of a major hazardous material release (large spills of high toxicity/greater than 55 gallons), workers will be evacuated from the building/site. Workers will assemble at the entrance to the site for a head count by their foremen and to await further instruction.

If an incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 8.1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the crew trailers, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

8.5 EVACUTION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide a more effective plan for bringing

the situation under control. The emergency coordinator is responsible for determining which situations require site evacuation.

8.5.1 Evacuation Signals and Routes

Two-way radio communication and an air horn will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. Each crew supervisor will have a two-way radio. A base station will be installed in the OHM office trailer to monitor for emergencies. Only the emergency coordinator will initiate total site evacuation, however, in his absence, decision to preserve the health and safety of employees will take precedence. Evacuation routes will be posted in each outside work area. Signs inside buildings will be posted on walls or other structural element of a building. Periodic drills will be conducted to familiarize each employee with the proper routes and procedures.

8.5.2 Evacuation Procedures

In the event evacuation is necessary, the following actions will be taken:

- The emergency signal will be activated.
- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the emergency coordinator.
- All persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders (e.g., foreman). Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.
- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency spill control coordinator.

- The emergency coordinator or designee will make a final tally of persons. No attempt to find persons not accounted for will involve endangering lives of OHM or other employees by re-entry into emergency areas.

In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Site Supervisor. The security guard will aid in accounting for visitors, contractors, and truckers by reference to sign-in sheets available from the guard shack.

- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.
- Re-entry into the site will be made only after the emergency coordinator gives clearance. At his direction, a signal or other notification will be given for re-entry into the facility.
- Drills will be held periodically to practice all of these procedures and will be treated with the same seriousness as an actual emergency.

8.6 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 8.1 provide a quick reference guide to follow in the event of a major spill.

8.6.1 Notification Procedures

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site emergency coordinator.

On-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.
- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

8.6.2 Procedures for Containing/Collecting Spills

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be enforced. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 8.1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), OHM's practice is to report a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA. OHM also follows the same practice for any substances not listed in the Acts noted above but which can be classified as a hazardous waste under RCRA.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.
- For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

8.6.3 Emergency Response Equipment

The following equipment will be staged in the support zone and throughout the site, as needed, to provide for safety and first aid during emergency responses. (Emergency eyewash equipment meets ANSI Standard;

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Eyewash/safety shower
- Emergency signal horn

In addition to the equipment listed above, OHM maintains direct reading instrumentation that may be used in emergency situations to assess the degree of environmental hazard. This equipment will only be used by the Site Safety Officer or other specially trained personnel. This equipment will be stored, charged and ready for immediate use in evaluating hazardous chemical concentrations. The equipment will be located at the OHM office trailer.

EQUIPMENT NAME	APPLICATION
Mini-Ram	Measures particulates in air

8.6.4 Emergency Spill Response Clean-Up Materials and Equipment

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be inventoried and inspected, visually, on a weekly basis.

The materials listed below may be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.
- Appropriate solvents, e.g., CITRIKLEEN, for decontamination of structures or equipment.

The following equipment will be kept on site and dedicated for spill cleanup:

- Plastic shovels for recovering corrosive and flammable materials.
- Sausage-shaped absorbent booms for diking liquid spills, drains, or sewers.
- Sorbent sheets (diapers) for absorbing liquid spills.
- Overpack drums for containerizing leaking drums.
- 55-gallon open-top drums for containerization of waste materials.

*NOTE: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labeled, and disposed of off-site.

8.7 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures OHM will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

8.8 MEDICAL EMERGENCY CONTINGENCY MEASURES

The procedures listed below will be used to respond to medical emergencies. The SSO will contact the local hospital and inform them of the site hazards and potential emergency situations. A minimum of two First-Aid/CPR trained personnel will be maintained on site.

8.8.1 Response

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-site emergency coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Site Safety Officer. The following actions will then be taken depending on the severity of the incident:

Life-Threatening Incident

If an apparent life-threatening condition exists, the crew supervisor will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by OHM personnel to a clean area for treatment by (EMS) personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.

Non Life-Threatening Incident

If it is determined that no threat to life is present, the Site Safety Officer will direct the injured person through decontamination procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.

*NOTE: The area surrounding an accident site must not be disturbed until the scene has been cleared by the Site Safety Officer.

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.
- If decontamination cannot be performed, observe the following procedures.
- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination, instruct them about specific decontamination procedures.
- Send site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.

All injuries, no matter how small, will be reported to the SSO or the Site Supervisor. An accident/injury/illness report will be completely and properly filled out and submitted to the Health and Safety Director/Project CIH, in accordance with OHM's reporting procedures.

A list of emergency telephone numbers is given in Table 8.1.

8.8.2 Notification

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Client Representative

8.9 FIRE CONTINGENCY MEASURES

OHM personnel and subcontractors are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.
- "No smoking" signs will be conspicuously posted in areas where flammable materials are present.
- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

8.9.1 Response

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify his or her supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.
- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.
- When a worker has extinguished a small fire, the emergency coordinator will be notified.

8.10 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds

8.10.1 Response

- Excavation/soil stockpiles will be covered with plastic liner.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge, initially crew trailers. The emergency coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police and other agencies.

8.10.2 Notification

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- OHM employees and subcontractors
- Client Representative
- Local Emergency Management Agency

8.11 SPILL/RELEASE CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken:

8.11.1 Response

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. Unsuspecting persons/vehicles will be warned of the hazard. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Attempt to stop the spill at the source, if possible. Without taking unnecessary risks,

personnel will attempt to stop the spill at the source. This may involve activities such as uprighting a drum, closing a valve or temporarily sealing a hole with a plug.

Utilizing radio communications, the emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and SSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-site personnel and off-site agencies. The emergency coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth
- Digging a sump, installing a polyethylene liner and
- Diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- Transferring the material from its original container to another container

The emergency coordinator will notify the CLIENT representative of the spill and steps taken to institute clean up. Emergency response personnel will clean up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill will be immediately available on-site. Such items may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums
- Pumps and miscellaneous hand tools

The major supply of material and equipment will be located in the Support Zone. Smaller supplies will kept at active work locations. The emergency coordinator will inspect the spill site to determine that the spill has been cleaned up to the satisfaction of the CLIENT representative. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is

prevented. The emergency coordinator will review the cause with the CLIENT representative and obtain his concurrence with the remedial action plan.

9.0 TRAINING REQUIREMENTS

As a requirement for work at this site, in any hazardous waste work area, all field personnel will be required to take a 40-hour training class. This training must cover the requirements in 29 CFR 1910.120: personal protective equipment, toxicological effects of various chemicals, hazard communication, blood borne pathogens, handling of unknown tanks and drums, confined-space entry procedures, electrical safety, etc. In addition, all personnel must receive annual 8-hour refresher training and three-day on-site training under a trained, experienced supervisor. Supervisory personnel shall have received an additional 8-hour training in handling hazardous waste operations.

All personnel entering the exclusion zone will be trained in the provisions of this site safety plan and be required to sign the Site Safety Plan Acknowledgment in Appendix C.

Site-specific training for activities at the Camp Legeune site will include potential site contaminants, Hazard Communication as per 29 CFR 1910.1200, site physical and environmental hazards, emergency response and evacuation procedures, and emergency telephone numbers will be held at the site location by the SS and SSO before any site work activities begin.

Outlines of the orientation for OHM / OHM sub-contract personnel and visitors are presented below:

OHM/SUBCONTRACTORS	VISITOR ORIENTATION
• HASP sign off • Sign in/out procedures • Site background • Chain of command • Rules and regulations • Hours of work • Absences • Equipment • Emergency Information • Emergency signal • Gathering point • Responsibilities/roles • Emergency phone numbers • Work Zones • Contaminants and Material Safety Data Sheets (MSDS) [Hazard Communication Program] • JSAs (Phase Safety Plans) • Forms, site-specific • Incident Reporting	• Sign in/out procedures • Review of Site map • Work Zones in progress • Hazard Communication • Emergency plan/signals • Training/medical requirements • Zones/areas open to visitors

10.0 MEDICAL SURVEILLANCE PROGRAM

All OHM personnel participate in a medical and health monitoring program. This program is initiated when the employee starts work with a complete physical and medical history and is continued on a regular basis. A listing of OHM's worker medical profile is shown below. This program was developed in conjunction with a consultant toxicologist and OHM's occupational health physician. Other medical consultants are retained when additional expertise is required.

The medical surveillance program meets the requirements of the OSHA Standard 29 CFR 1910.120/1926.65(f).

No specific tests are expected for this project.

The following information is provided in the event that medical attention is necessary.

The IT/OHM Medical Director is:

Dr. Elayne Theriault
Continuum Health Care
800-229-3674 (office)

The occupational physician for this project is:

Dr. James Conelly
Atlantic Occupational Health
4970 Dorchester Rd, Suite A
Charleston, SC 29418
843-207-7130 (office)
843-207-8633 (fax)

The IT/OHM Medical Director and the CIH and/or HSM will be immediately notified of any suspected exposures to hazardous materials/wastes.

APPENDIX A
MATERIAL SAFETY DATA SHEETS (MSDS's)

MSDS's for site contaminants are included in this section. A listing of chemicals that may be brought to the site are listed below. Copies of the MSDS' for those chemicals listed below will be maintained in the OHM site trailer.

ANTI-FOG
Bleach
Diesel Fuel
Fire extinguishers
Gasoline
Gear lube
Grease
Hydraulic oil
Isobutylene(calibration gas)
Isopropyl alcohol
Liquid detergent
Methane (calibration gas)
Motor oil
Pentane (calibration gas)
Starting fluid
WD-40

SUPELCO -- BIS(2-ETHYLHEXYL)PHTHALATE, R430660
MATERIAL SAFETY DATA SHEET
NSN: 663000N056536
Manufacturer's CAGE: 54968
Part No. Indicator: A
Part Number/Trade Name: BIS(2-ETHYLHEXYL)PHTHALATE, R430660

General Information

Company's Name: SUPELCO INC
Company's Street: SUPELCO PARK
Company's City: BELLFONTE
Company's State: PA
Company's Country: US
Company's Zip Code: 16823-0048
Company's Emerg Ph #: 814-359-3441
Company's Info Ph #: 814-359-3441
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 04JAN90
Safety Data Review Date: 21DEC94
MSDS Serial Number: BWNHX
Hazard Characteristic Code: NK

Ingredients/Identity Information

Proprietary: NO
Ingredient: PHTHALIC ACID,BIS(2-ETHYL(HEXYL)ESTER; (1,2-BENZENEDICARBOXYLIC ACID, BIS(2-ETHYLHEXYL)ESTER) (SARA III)
Ingredient Sequence Number: 01
NIOSH (RTECS) Number: TI0350000
CAS Number: 117-81-7
OSHA PEL: 5 MG/M3
ACGIH TLV: 5 MG/M3; 10 STEL

Physical/Chemical Characteristics

Appearance And Odor: CLEAR COLORLESS LIQUID.
Boiling Point: 723F,384C
Melting Point: -58F,-50C
Vapor Pressure (MM Hg/70 F): N/A
Vapor Density (Air=1): N/A
Specific Gravity: 0.981
Evaporation Rate And Ref: N/A
Percent Volatiles By Volume: N/A

Fire and Explosion Hazard Data

Flash Point: 405F,207C
Lower Explosive Limit: N/A
Upper Explosive Limit: N/A
Extinguishing Media: WATER, CO*2, DRY CHEMICAL, ALCOHOL FOAM.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED SCBA & FULL PROTECTIVE EQUIPMENT(FP N).
Unusual Fire And Expl Hazrds: NONE SPECIFIED BY MANUFACTURER.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: OXIDIZING AGENTS.
Hazardous Decomp Products: NONE SPECIFIED BY MANUFACTURER.

Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT.

Health Hazard Data

LD50-LC50 Mixture: NONE SPECIFIED BY MANUFACTURER.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: NO
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: MAY IRRITATE EYES &/SKIN. HARMFUL IF SWALLOWED. CONTAINS MATERIAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER. GASTROINTESTINAL DISTURBANCES. REPORTED ANIMAL CARCINOGEN. POSSIBLE TERATOGEN.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER: IARC MONOGRAPHS, SUPPLEMENT, VOL 7, PG 322, 1987: GROUP 2A. NTP 7TH (SUPP DATA)
Signs/Symptoms Of Overexp: SEE HEALTH HAZARDS.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES: FLUSH EYES W/WATER FOR AT LEAST 15 MINUTES. SKIN: PROMPLTY WASH SKIN W/MILD SOAP & LARGE VOLUMES OF WATER. REMOVE CONTAMD CLTHG. INHAL: IMMED MOVE TO FRESH AIR. GIVE OXYGEN IF BREATHING IS LABORED. IF BREATHING STOPS, GIVE ARTIFICIAL RESPIRATION. CONTACT MD. INGEST: CALL MD IMMEDIATELY(FP N).

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: TAKE UP WITH ABSORBENT MATERIAL. VENTILATE AREA. FLUSH AREA WITH WATER.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: COMPLY WITH ALL APPLICABLE LOCAL, STATE & FEDERAL REGULATIONS.
Precautions-Handling/Storing: STORE IN SEALED CONTAINER IN COOL, DRY LOCATION.
Other Precautions: REPORTED CANCER HAZARD.

Control Measures

Respiratory Protection: WEAR NIOSH/MSHA APPROVED RESPIRATORY PROTECTION.
Ventilation: USE ONLY IN EXHAUST HOOD.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPRVD CHEM WORKERS GOGGLES(FP N).
Other Protective Equipment: NONE SPECIFIED BY MANUFACTURER.
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: EXPLAN OF CARCIN: ANNUAL REPORT ON CARCINOGENS, 1994: ANTICIPATED TO BE CARCINOGEN. ANIMAL: LIVER, TESTES.

Transportation Data

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 21DEC94
Label Date: 21DEC94
Label Status: G
Common Name: BIS(2-ETHYLHEXYL)PHTHALATE, R430660
Chronic Hazard: YES
Signal Word: CAUTION!
Acute Health Hazard-Slight: X

Contact Hazard-Slight: X
Fire Hazard-Slight: X
Reactivity Hazard-None: X
Special Hazard Precautions: COMBUSTIBLE. ACUTE: MAY IRRITATE EYES &/SKIN. HARMFUL IF SWALLOWED. GASTROINTESTINAL DISTURBANCES. CHRONIC: CANCER HAZARD. CONTAINS PHTHALIC ACID, BIS(2-ETHYLHEXYL)ESTER) WHICH IS LISTED AS A LIVER CARCINOGEN TO ANIMALS(FP N). POSSIBLE TERATOGEN.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: SUPELCO INC
Label Street: SUPELCO PARK
Label City: BELLFONTE
Label State: PA
Label Zip Code: 16823-0048
Label Country: US
Label Emergency Number: 814-359-3441

CHROMIUM SULFATE

MSDS Number: C4389 --- *Effective Date: 11/17/99*

1. Product Identification

Synonyms: Chromium MS; sulfuric acid, chromium (3+) salts (3:2), hydrate; chromium (III) sulfate (2.3), hydrate; chromium sulfate, n-hydrate;
CAS No.: 10101-53-8
Molecular Weight: Not applicable to mixtures.
Chemical Formula: Cr2(SO4)3 - xH2O
Product Codes: 1630

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Chromic Sulfate	10101-53-8	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 0 - None
Reactivity Rating: 0 - None

Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Orange (General Storage)

Potential Health Effects

Inhalation:
Causes irritation to the respiratory tract. Symptoms may include coughing, shortness of breath. May cause headache, dyspnea, and fever. May also cause tracheobronchial irritation and pulmonary edema.
Ingestion:
Causes irritation to the gastrointestinal tract. Large oral doses may cause dizziness intense thirst, abdominal pain, vomiting, and shock. Death may occur from renal failure. Chromium compounds in the 3+ state have a much lower toxicity than those in the 6+ state.
Skin Contact:
Causes irritation to skin. Symptoms include redness, itching, and pain. Prolonged contact may cause skin ulcerations. May cause allergic skin reactions.
Eye Contact:
Causes irritation, redness, and pain. Prolonged contact may cause eye damage.
Chronic Exposure:
Prolonged or repeated skin exposure may cause dermatitis. Prolonged or repeated inhalation of dust may cause perforation of the nasal septum.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin conditions or impaired respiratory function may be more susceptible to the effects of this substance.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard.
Explosion:
Not considered to be an explosion hazard.
Fire Extinguishing Media:

Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. Do not flush to the sewer. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
for Cr(III) compounds = 0.5mg/m3 (TWA)

-ACGIH Threshold Limit Value (TLV):
for Cr(III) compounds = 0.5 mg/m3 (TWA), A4 - Not classifiable as a human carcinogen

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency, or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator.
WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Violet or green crystals.
Odor:
Odorless.
Solubility:
Appreciable in water.
Specific Gravity:
1.7
pH:
No information found.
% Volatiles by volume @ 21C (70F):
0
Boiling Point:
Decomposes at red heat.
Melting Point:
90C (194F)
Vapor Density (Air=1):
No information found.
Vapor Pressure (mm Hg):
No information found.
Evaporation Rate (BuAc=1):
No information found.

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Will decompose to chromic acid when heated.
Hazardous Decomposition Products:
Burning may produce chrome oxides. Burning may produce sulfur oxides.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers.
Conditions to Avoid:
Heat, incompatibles.

11. Toxicological Information

Toxicological Data:

Investigated as a tumorigen and mutagen.
Carcinogenicity:
ACGIH classification: Group A4 - Not classifiable as a human carcinogen.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Chromic Sulfate (10101-53-8)	No	No	3

12. Ecological Information

Environmental Fate:
When released into the soil, this material may leach into groundwater. When released into water, this material is not expected to evaporate significantly. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Not regulated.

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Chromic Sulfate (10101-53-8)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Chromic Sulfate (10101-53-8)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.

```
Chromic Sulfate (10101-53-8)                No     No       No     Chromium com

--------\Federal, State & International Regulations - Part 2\----------------
                                                        -RCRA-     -TSCA-
Ingredient                                  CERCLA      261.33      8(d)
------------------------------------------  ------      ------     ------
Chromic Sulfate (10101-53-8)                1000        No          No

Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  No
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: No  Pressure: No
Reactivity: No          (Pure / Solid)
```

Australian Hazchem Code: No information found.
Poison Schedule: No information found.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **1** Flammability: **0** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid breathing dust.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases, get medical attention.
Product Use:
Laboratory Reagent.
Revision Information:
No changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF

MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

AMOCO OIL -- AMOCO NO. 1 DIESEL FUEL - DIESEL FUEL
MATERIAL SAFETY DATA SHEET
NSN: 9140002865286
Manufacturer's CAGE: 15958
Part No. Indicator: A
Part Number/Trade Name: AMOCO NO. 1 DIESEL FUEL

General Information

Item Name: DIESEL FUEL
Company's Name: AMOCO OIL CO
Company's Street: 200 E RANDOLPH DR MC 1408
Company's City: CHICAGO
Company's State: IL
Company's Country: US
Company's Zip Code: 60601-6401
Company's Emerg Ph #: 800-424-9300 SPL, 800-447-8735 HEAL
Company's Info Ph #: 312-856-5111
Record No. For Safety Entry: 015
Tot Safety Entries This Stk#: 048
Status: SE
Date MSDS Prepared: 24JUL89
Safety Data Review Date: 27SEP91
Supply Item Manager: KY
MSDS Preparer's Name: R. G. FARMER
MSDS Serial Number: BKSMV
Specification Number: VV-F-800
Spec Type, Grade, Class: DF-1 GRADE
Hazard Characteristic Code: F4
Unit Of Issue: GL
Type Of Container: BULK

Ingredients/Identity Information

Proprietary: NO
Ingredient: PETROLEUM DISTILLATES
Ingredient Sequence Number: 01
Percent: UNKNOWN
NIOSH (RTECS) Number: 1001292PD
OSHA PEL: NOT ESTABLISHED
ACGIH TLV: NOT ESTABLISHED
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: NAPHTHALENE (SARA III)
Ingredient Sequence Number: 02
Percent: UNKNOWN
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM/15 STEL
ACGIH TLV: 10 PPM/15 STEL; 9192
Other Recommended Limit: NONE SPECIFIED

Proprietary: NO
Ingredient: XYLENES (O-,M-,P- ISOMERS) (SARA III)
Ingredient Sequence Number: 03
Percent: UNKNOWN
NIOSH (RTECS) Number: ZE2100000
CAS Number: 1330-20-7
OSHA PEL: 100 PPM/150 STEL
ACGIH TLV: 100 PPM/150STEL;9192
Other Recommended Limit: NONE SPECIFIED

Physical/Chemical Characteristics

Appearance And Odor: CLEAR, BRIGHT LIQUID.
Boiling Point: 3F,-16C
Specific Gravity: 0.81-0.85
Decomposition Temperature: UNKNOWN
Solubility In Water: NEGLIGIBLE BELOW .1%
Viscosity: 1.4-2.2
Corrosion Rate (IPY): UNKNOWN

Fire and Explosion Hazard Data

Flash Point: 110F,43C
Flash Point Method: TCC
Lower Explosive Limit: 6
Upper Explosive Limit: 1.3
Extinguishing Media: AGENTS APPROVED FOR CLASS B HAZARDS (CARBON DIOXIDE, FOAM, OR DRY CHEMICAL, HALOGENATED AGENTS, STEAM) OR WATER FOG.
Special Fire Fighting Proc: NONE SPECIFIED BY MANUFACTURER.
Unusual Fire And Expl Hazrds: COMBUSTIBLE LIQUID.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): HIGH HEAT, OPEN FLAMES AND OTHER SOURCES OF IGNITION.
Materials To Avoid: STRONG OXIDIZING AGENTS.
Hazardous Decomp Products: NONE SPECIFIED BY MANUFACTURER.
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NONE SPECIFIED BY MANUFACTURER.

Health Hazard Data

LD50-LC50 Mixture: LD50 (ORAL RAT) IS >5 G/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: EYE-NO SIGNIFICANT IRRITATION EXPECTED. SKIN-CAUSE SKIN IRRITATION ON PROLONGED/REPEATED CONTACT. INHALE-NO SIGNIFICANT HEALTH HAZARD IDENTIFIED FOR THE LIQUID FUEL. INGEST-LOW VISCOSITY PRODUCT. HARMFUL OR FATAL IF ASPIRATED INTO LUNGS.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: THIS COMPOUND CONTAINS NO INGREDIENTS AT CONCENTRATIONS OF 0.1% OR GREATER THAT ARE CARCINOGENS OR SUSPECT CARCINOGENS.
Signs/Symptoms Of Overexp: MAY CAUSE SKIN IRRITATION. INHALATION OF MIST OR HIGH CONCENTRATIONS OF VAPORS CAN PRODUCE HEADACHE, DIZZINESS AND NAUSEA AND POSSIBLY IRRITATION OF THE EYE, NOSE AND THROAT. ASPIRATION OF THIS PRODUCT INTO THE LUNGS CAN CAUSE CHEMICAL PNEUMONIA & CAN BE FATAL.
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: EYES-FLUSH EYES WITH PLENTY OF WATER. SKIN- WASH EXPOSED SKIN WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING INCLUDING SHOES. CLEAN BEFORE REUSING. INHALATION-IF ADVERSE EFFECTS OCCUR, REMOVE TO UNCONTAMINATED AREA. INGESTION-DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: REMOVE OR SHUT OFF ALL IGNITION SOURCES. USE WATER SPRAY TO DISPERSE VAPORS. TREAT AS AN OIL SPILL. CONTAIN AND REMOVE BY MECHANICAL MEANS.
Neutralizing Agent: NOT APPLICABLE

Waste Disposal Method: DISPOSAL MUST BE MADE IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS. ENCLOSED-CONTROLLED INCINERATION IS RECOMMENDED UNLESS DIRECTED OTHERWISE BY APPLICABLE ORDINANCES.
Precautions-Handling/Storing: STORE IN COMPATIBLE LIQUID STORAGE AREA.
Other Precautions: KEEP AWAY FROM IGNITION SOURCES (E.G., HEAT AND OPEN FLAMES). AVOID STRONG OXIDIZERS.

Control Measures

Respiratory Protection: USE WITH ADEQUATE VENTILATION.
Ventilation: LOCAL AND MECHANICAL(GENERAL) EXHAUST TO PROVIDE ADEQUATE VENTILATION.
Protective Gloves: WEAR PROTECTIVE GLOVES.E RUBBER GLOVES
Eye Protection: NONE REQUIRED.
Other Protective Equipment: WEAR PROTECTIVE CLOTHING. HAVE EMERGENCY EYE WASH AND SAFETY SHOWER AVAILABLE.
Work Hygienic Practices: WASH THOROUGHLY AFTER HANDLING AND BEFORE EATING, DRINKING OR SMOKING. LAUNDER CONTAMINATED CLOTHING BEFORE REUSE.
Suppl. Safety & Health Data: AVOID PROLONGED OR REPEATED EXPOSURE. DO NOT GET ON SKIN OR IN EYES. THE USE OF EYE PROTECTION IS A GOOD INDUSTRIAL PRACTICE.

Transportation Data

Trans Data Review Date: 91270
DOT PSN Code: GTF
DOT Proper Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT
DOT Class: 3
DOT ID Number: UN1202
DOT Pack Group: III
DOT Label: FLAMMABLE LIQUID
IMO PSN Code: HNZ
IMO Proper Shipping Name: FUEL OIL NO. 1
IMO Regulations Page Number: SEE 3375
IMO UN Number: 1223
IMO UN Class: 3.3
IMO Subsidiary Risk Label: -
IATA PSN Code: MTX
IATA UN ID Number: 1202
IATA Proper Shipping Name: GAS OIL
IATA UN Class: 3
IATA Label: FLAMMABLE LIQUID
AFI PSN Code: MTX
AFI Prop. Shipping Name: GAS OIL OR DIESEL FUEL OR HEATING OIL, LIGHT
AFI Class: 3
AFI ID Number: UN1202
AFI Pack Group: III
AFI Basic Pac Ref: 7-7
MMAC Code: NR
N.O.S. Shipping Name: FUEL OIL NO. 1
Additional Trans Data: COMBUSTIBLE LIQUID

Disposal Data

Label Data

Label Required: YES
Technical Review Date: 27SEP91
Label Status: G
Common Name: AMOCO NO. 1 DIESEL FUEL
Signal Word: DANGER!
Acute Health Hazard-Severe: X
Contact Hazard-Moderate: X

Fire Hazard-Moderate: X
Reactivity Hazard-None: X
Special Hazard Precautions: REMOVE OR SHUT OFF ALL IGNITION SOURCES. USE WATER SPRAY TO DISPERSE VAPORS. TREAT AS AN OIL SPILL. CONTAIN AND REMOVE EYES-FLUSH EYES WITH PLENTY OF WATER. SKIN-WASH EXPOSED SKIN WITH SOAP AND WATER. REMOVE CONTAMINATED CLOTHING INCLUDING SHOES. CLEAN BEFORE REUSING. INHALATION-IF ADVERSE EFFECTS OCCUR, REMOVE TO UNCONTAMINATED AREA. INGESTION-DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION.
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: AMOCO OIL CO
Label Street: 200 E RANDOLPH DR MC 1408
Label City: CHICAGO
Label State: IL
Label Zip Code: 60601-6401
Label Country: US
Label Emergency Number: 800-424-9300 SPL, 800-447-8735 HEAL

International Chemical Safety Cards

ETHYLBENZENE

ICSC: 0268

ETHYLBENZENE
Ethylbenzol
Phenylethane
EB
$C_8H_{10}/C_6H_5\text{-}C_2H_5$
Molecular mass: 106.2

CAS # 100-41-4
RTECS # DA0700000
ICSC # 0268
UN # 1175
EC # 601-023-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS!	
• **INHALATION**	Cough. Dizziness. Drowsiness. Headache.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• **SKIN**	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• **EYES**	Redness. Pain. Blurred vision.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• **INGESTION**	(further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking liquid in covered containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer (extra personal protection: A filter respirator for organic vapour).	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-20 S: (2-)16-24/25-29 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0268

International Chemical Safety Cards

ETHYLBENZENE

ICSC: 0268

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH AROMATIC ODOUR. **PHYSICAL DANGERS:** The vapour mixes well with air, explosive mixtures are easily formed. **CHEMICAL DANGERS:** Reacts with strong oxidants. Attacks plastic and rubber. **OCCUPATIONAL EXPOSURE LIMITS (OELs):** TLV (as TWA): 100 ppm; 434 mg/m^3; as STEL: 125 ppm; 543 mg/m^3 (ACGIH 1994-1995). MAK: 100 ppm; 440 mg/m^3 (1994).	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion. **INHALATION RISK:** A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance irritates the eyes, the skin and the respiratory tract. Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure far above OEL could cause lowering of consciousness. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis.
PHYSICAL PROPERTIES	Boiling point: 136°C Melting point: -95°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 20°C: 0.015 Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 18°C c.c. Auto-ignition temperature: 432°C Explosive limits, vol% in air: 1.0-6.7 Octanol/water partition coefficient as log Pow: 3.2
ENVIRONMENTAL DATA	The substance is harmful to aquatic organisms.	

NOTES

The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-522
NFPA Code: H2; F3; R0

ADDITIONAL INFORMATION

ICSC: 0268 **ETHYLBENZENE**

Please reduce your browser font size for better viewing and printing.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

MALLINCKRODT J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

LEAD METAL

MSDS Number: L2347 --- *Effective Date: 12/08/96*

1. Product Identification

Synonyms: Granular lead, pigment metal; C.I. 77575
CAS No.: 7439-92-1
Molecular Weight: 207.19
Chemical Formula: Pb
Product Codes: J.T. Baker: 2256, 2266 Mallinckrodt: 5668

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Lead	7439-92-1	95 - 100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! MAY BE FATAL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. NEUROTOXIN. AFFECTS THE GUM TISSUE, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD AND REPRODUCTIVE SYSTEM. POSSIBLE CANCER HAZARD. MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)

Flammability Rating: 0 - None
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Lead can be absorbed through the respiratory system. Local irritation of bronchia and lungs can occur and, in cases of acute exposure, symptoms such as metallic taste, chest and abdominal pain, and increased lead blood levels may follow. See also Ingestion.

Ingestion:
POISON! The symptoms of lead poisoning include abdominal pain and spasms, nausea, vomiting, headache. Acute poisoning can lead to muscle weakness, "lead line" on the gums, metallic taste, definite loss of appetite, insomnia, dizziness, high lead levels in blood and urine with shock, coma and death in extreme cases.

Skin Contact:
Lead and lead compounds may be absorbed through the skin on prolonged exposure; the symptoms of lead poisoning described for ingestion exposure may occur. Contact over short periods may cause local irritation, redness and pain.

Eye Contact:
Absorption can occur through eye tissues but the more common hazards are local irritation or abrasion.

Chronic Exposure:
Lead is a cumulative poison and exposure even to small amounts can raise the body's content to toxic levels. The symptoms of chronic exposure are like those of ingestion poisoning; restlessness, irritability, visual disturbances, hypertension and gray facial color may also be noted.

Aggravation of Pre-existing Conditions:
Persons with pre-existing kidney, nerve or circulatory disorders or with skin or eye problems may be more susceptible to the effects of this substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

Ingestion:
Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

---

5. Fire Fighting Measures

Fire:
Not considered to be a fire hazard. Powder/dust is flammable when heated or exposed to flame.

Explosion:
Not considered to be an explosion hazard.

Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire. Do not allow water runoff to enter sewers or waterways.

Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Can produce toxic lead fumes at elevated temperatures and also react with oxidizing materials.

---

6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

---

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from incompatible substances. Areas in which exposure to lead metal or lead compounds may occur should be identified by signs or appropriate means, and access to the area should be limited to authorized persons. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

---

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
For lead, metal and inorganic dusts and fumes, as Pb: -OSHA Permissible Exposure Limit (PEL): 0.05 mg/m3 (TWA) For lead, elemental and inorganic compounds, as Pb: -ACGIH Threshold Limit Value (TLV): 0.05 mg/m3 (TWA), A3 animal carcinogen ACGIH Biological Exposure Indices (BEI): 30 ug/100ml, notation B (see actual Indices for more information). For lead, inorganic: -NIOSH Recommended Exposure Limit

(REL): 0.1 mg/m3 (TWA)

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face high efficiency dust/mist respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece high efficiency dust/mist respirator may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

Other Control Measures:
Eating, drinking, and smoking should not be permitted in areas where solids or liquids containing lead compounds are handled, processed, or stored. See OSHA substance-specific standard for more information on personal protective equipment, engineering and work practice controls, medical surveillance, record keeping, and reporting requirements. (29 CFR 1910.1025).

---

9. Physical and Chemical Properties

Appearance:
Small, white to blue-gray metallic shot or granules.

Odor:
Odorless.

Solubility:
Insoluble in water.

Density:
11.34

pH:
No information found.

% Volatiles by volume @ 21C (70F):

1-Methylnaphthalene, 97%
83673

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: 1-Methylnaphthalene, 97%
Catalog Numbers:
AC127160000, AC127160050, AC127161000, AC127165000
Synonyms:
1-Methylnaphthalene; Alpha-methylnaphthalene
Company Identification: Acros Organics N.V.
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
90-12-0	1-Methylnaphthalene	97%	201-966-8

Hazard Symbols: XN
Risk Phrases: 22 36/37/38

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: clear colorless to light yellow. Flash Point: 82 deg C.
Caution! Combustible liquid. May be harmful if swallowed. Causes eye and skin irritation. Causes digestive and respiratory tract irritation.
Target Organs: None.
Potential Health Effects

Eye:
Causes eye irritation.

Skin:
Causes skin irritation.

Ingestion:
May be harmful if swallowed. Causes digestive tract irritation.

Inhalation:
Causes respiratory tract irritation.

Chronic:
Not available.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids. Get medical aid immediately.

Skin:
Get medical aid. Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Remove contaminated clothing and shoes.

Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation:
Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician:
Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full

protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Combustible Liquid. Containers may explode when heated.

Extinguishing Media:
In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam. Use water spray to cool fire-exposed containers.

Autoignition Temperature: 529 deg C (984.20 deg F)
Flash Point: 82 deg C (179.60 deg F)
(estimated) Health: 1; Flammability: 2; Reactivity: 1
Explosion Limits, Lower: .70 vol %
Upper: 6.50 vol %

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Absorb spill with inert material, (e.g., dry sand or earth), then place into a chemical waste container. Wash area with soap and water. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use with adequate ventilation. Avoid contact with eyes, skin, and clothing. Avoid contact with heat, sparks and flame. Avoid ingestion and inhalation. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage:
Keep away from heat and flame. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep containers tightly closed.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Use adequate ventilation to keep airborne concentrations low.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
1-Methylnaphthalene	none listed	none listed	none listed

OSHA Vacated PELs:
1-Methylnaphthalene:
No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment
Eyes:
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin:
Wear appropriate protective gloves to prevent skin exposure.

Clothing:
Wear appropriate protective clothing to prevent skin exposure.

Respirators:
Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State: Liquid
Appearance: clear colorless to light yellow

Odor:	None reported.
pH:	Not available.
Vapor Pressure:	Not available.
Vapor Density:	Not available.
Evaporation Rate:	Not available.
Viscosity:	Not available.
Boiling Point:	240.0 - 243.0 deg C
Freezing/Melting Point:	-22 deg C
Decomposition Temperature:	Not available.
Solubility:	insoluble
Specific Gravity/Density:	1.0010g/cm3
Molecular Formula:	C11H10
Molecular Weight:	142.20

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, ignition sources, strong oxidants.
Incompatibilities with Other Materials:
Strong oxidizing agents.
Hazardous Decomposition Products:
Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 90-12-0: QJ9630000
LD50/LC50:
CAS# 90-12-0: Oral, rat: LD50 = 1840 mg/kg.
Carcinogenicity:
1-Methylnaphthalene -
Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Epidemiology:
No data available.
Teratogenicity:
No data available.
Reproductive Effects:
No data available.
Neurotoxicity:
No data available.
Mutagenicity:
No data available.
Other Studies:
No data available.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:
Not available.
Environmental Fate:
Not available.
Physical/Chemical:
Not available.
Other:
Not available.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.
RCRA D-Series Maximum Concentration of Contaminants:
None listed.
RCRA D-Series Chronic Toxicity Reference Levels: None listed.
RCRA F-Series: None listed.
RCRA P-Series: None listed.
RCRA U-Series: None listed.
Not listed as a material banned from land disposal according to RCRA.

**** SECTION 14 - TRANSPORT INFORMATION ****

US DOT
No information available
IMO
No information available.
IATA
No information available.
RID/ADR
No information available.
Canadian TDG
No information available.

**** SECTION 15 - REGULATORY INFORMATION ****

US FEDERAL
TSCA
CAS# 90-12-0 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA
Section 302 (RQ)
None of the chemicals in this material have an RQ.
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 90-12-0: flammable.
Section 313
No chemicals are reportable under Section 313.
Clean Air Act:
This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous by OSHA.

STATE
1-Methylnaphthalene can be found on the following state right to know lists: Florida, Pennsylvania, Massachusetts.
California No Significant Risk Level:
None of the chemicals in this product are listed.

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN
Risk Phrases:
R 22 Harmful if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.
Safety Phrases:
S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S 36/37/39 Wear suitable protective clothing, gloves and eye/face protection.
S 7 Keep container tightly closed.

WGK (Water Danger/Protection)

CAS# 90-12-0: No information available.

Canada

CAS# 90-12-0 is listed on Canada's DSL/NDSL List.
This product has a WHMIS classification of D2B.
CAS# 90-12-0 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 90-12-0: OEL-RUSSIA:STEL 20 mg/m3

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 3/01/1994 Revision #3 Date: 8/27/1998

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Please reduce your browser font size for better viewing and printing.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

MALLINCKRODT J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

NAPHTHALENE

MSDS Number: N0090 --- *Effective Date: 02/25/99*

1. Product Identification

Synonyms: Naphthene; mothballs; tar camphor; naphthaliin; white-tar
CAS No.: 91-20-3
Molecular Weight: 128.16
Chemical Formula: C10H8
Product Codes:
J.T. Baker: 2718
Mallinckrodt: 6348

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Naphthalene	91-20-3	90 - 100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 2 - Moderate
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of dust or vapors can cause headache, nausea, vomiting, extensive sweating, and disorientation. The predominant reaction is delayed intravascular hemolysis with symptoms of anemia, fever, jaundice, and kidney or liver damage.
Ingestion:
Toxic. Can cause headache, profuse perspiration, listlessness, dark urine, nausea, vomiting and disorientation. Intravascular hemolysis may also occur with symptoms similar to those noted for inhalation. Severe cases may produce coma with or without convulsions. Death may result from renal failure.
Skin Contact:
Can irritate the skin and, on prolonged contact, may cause rashes and allergy. "Sensitized" individuals may suffer a severe dermatitis.
Eye Contact:
Vapors and solid causes irritation, redness and pain. Very high exposures can damage the nerves of the eye.
Chronic Exposure:
Has led to cataract formation in eyes. May cause skin allergy.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin, blood or vascular disorders or impaired respiratory function may be more susceptible to the effects of the substance. Particularly susceptible individuals are found in the general population, most commonly in dark skinned races.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
Give large amounts of water to drink. Never give anything by mouth to an unconscious person. Get medical attention.
Skin Contact:
Wash skin with soap or mild detergent and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 87C (189F) CC

Autoignition temperature: 526C (979F)
Combustible. May be ignited by heat, sparks or flame. May burn rapidly with flare-burning effect. Fire may produce irritating or poisonous gases.
Explosion:
Explosive limits, volume % in air: lel: 0.9; uel: 5.9. Above flashpoint, vapor-air mixtures are explosive within flammable limits noted above. Closed containers exposed to heat may explode. Contact with strong oxidizers may cause fire or explosion.
Fire Extinguishing Media:
Dry chemical, foam, water or carbon dioxide. Foam or direct water spray on molten naphthalene may cause extensive foaming. Molten napthalene spatters in contact with water; apply water from as far a distance as possible.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Remove all sources of ignition. Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Spills: Clean up spills in a manner that does not disperse dust into the air. Use non-sparking tools and equipment. Reduce airborne dust and prevent scattering by moistening with water. Pick up spill for recovery or disposal and place in a closed container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Keep away from moisture and oxidizers. Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
- OSHA Permissible Exposure Limit (PEL):
10 ppm, 50 mg/m3.

- ACGIH Threshold Limit Value (TLV):
TWA= 10 ppm, 52 mg/m3
STEL= 15 ppm, 79 mg/m3.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for

details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face respirator with an organic vapor cartridge and particulate filter (NIOSH type P95 or R95 filter) may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece respirator with an organic vapor cartridge and particulate filter (NIOSH P100 or R100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. Please note that N series filters are not recommended for this material. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator. WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or full face shield where dusting or splashing of solutions is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
White crystals.
Odor:
Strong coal tar odor (moth balls).
Solubility:
Insoluble in water.
Specific Gravity:
1.2
pH:
No information found.
% Volatiles by volume @ 21C (70F):
No information found.
Boiling Point:
218C (424F)
Melting Point:
80C (176F)
Vapor Density (Air=1):
4.4
Vapor Pressure (mm Hg):
1 @ 53C (127F)
Evaporation Rate (BuAc=1):
< 1

10. Stability and Reactivity

Stability:
Stable at room temperature in sealed containers. Sublimes appreciably at temperatures above melting point.
Hazardous Decomposition Products:

Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizers, strong alkalis and strong mineral acids, mixtures of aluminum trichloride and benzoyl chloride. Reacts violently with chromic anhydride. Melted naphthalene will attack some forms of plastics, rubber, and coatings.
Conditions to Avoid:
Avoid heat, sparks, flames and other ignition sources and incompatibles.

11. Toxicological Information

Oral rat LD50: 490 mg/kg;
Inhalation rat LC50: 340 mg/m3, 1 hour;
Skin rabbit LD50: > 20 g/kg;
Irritation data: skin (open Draize) rabbit 495 mg, mild; eye (standard Draize) rabbit 100 mg, mild;
Investigated as a tumorigen, mutagen and reproductive effector.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Naphthalene (91-20-3)	No	No	None

12. Ecological Information

Environmental Fate:
When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. When released into water, this material may biodegrade to a moderate extent. When released into the water, this material is expected to have a half-life between 1 and 10 days. This material may bioaccumulate to some extent. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day.
Environmental Toxicity:
No information found.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: NAPHTHALENE, REFINED
Hazard Class: 4.1
UN/NA: UN1334
Packing Group: III
Information reported for product/size: 1KG

International (Water, I.M.O.)

Proper Shipping Name: NAPHTHALENE, REFINED
Hazard Class: 4.1
UN/NA: UN1334
Packing Group: III
Information reported for product/size: 1KG

International (Air, I.C.A.O.)

Proper Shipping Name: NAPHTHALENE, REFINED
Hazard Class: 4.1
UN/NA: UN1334
Packing Group: III
Information reported for product/size: 1KG

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Naphthalene (91-20-3)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Naphthalene (91-20-3)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Naphthalene (91-20-3)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Naphthalene (91-20-3)	100	U165	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Solid)

Australian Hazchem Code: 2Z
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **2** Reactivity: **0**
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED OR INHALED. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. MAY CAUSE ALLERGIC SKIN REACTION. MAY AFFECT LIVER, KIDNEY, BLOOD AND CENTRAL NERVOUS SYSTEM. COMBUSTIBLE.
Label Precautions:
Avoid contact with eyes, skin and clothing.
Avoid prolonged or repeated contact with skin.
Avoid breathing dust.
Avoid breathing vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat, sparks and flame.
Label First Aid:
In all cases call a physician. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If swallowed, give large amounts of water to drink. Never give anything by mouth to an unconscious person.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3, 8.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.
****

Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

Please reduce your browser font size for better viewing and printing.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

MALLINCKRODT J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

TOLUENE

MSDS Number: T3913 --- *Effective Date: 11/17/99*

1. Product Identification

Synonyms: Methylbenzene; Toluol; Phenylmethane
CAS No.: 108-88-3
Molecular Weight: 92.14
Chemical Formula: C6H5-CH3
Product Codes:
J.T. Baker: 5375, 5584, 5809, 5812, 9336, 9351, 9364, 9456, 9457, 9459, 9460, 9462, 9466, 9472, 9476
Mallinckrodt: 4483, 8091, 8092, 8604, 8605, 8608, 8610, 8611, V560

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Toluene	108-88-3	100%	Yes

3. Hazards Identification

Emergency Overview

POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 0 - None
Contact Rating: 1 - Slight
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation may cause irritation of the upper respiratory tract. Symptoms of overexposure may include fatigue, confusion, headache, dizziness and drowsiness. Peculiar skin sensations (e. g. pins and needles) or numbness may be produced. Very high concentrations may cause unconsciousness and death.
Ingestion:
Swallowing may cause abdominal spasms and other symptoms that parallel over-exposure from inhalation. Aspiration of material into the lungs can cause chemical pneumonitis, which may be fatal.
Skin Contact:
Causes irritation. May be absorbed through skin.
Eye Contact:
Causes severe eye irritation with redness and pain.
Chronic Exposure:
Reports of chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Liver and kidney damage may occur. Repeated or prolonged contact has a defatting action, causing drying, redness, dermatitis. Exposure to toluene may affect the developing fetus.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or impaired liver or kidney function may be more susceptible to the effects of this substance. Alcoholic beverage consumption can enhance the toxic effects of this substance.

---

4. First Aid Measures

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. CALL A PHYSICIAN IMMEDIATELY.
Ingestion:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.
Skin Contact:
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician immediately.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 7C (45F) CC
Autoignition temperature: 422C (792F)
Flammable limits in air % by volume:
lel: 3.3; uel: 19
Flammable liquid and vapor!
Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire or explosion. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Water spray may be used to keep fire exposed containers cool.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
Toluene:
- OSHA Permissible Exposure Limit (PEL):
200 ppm (TWA); 300 ppm (acceptable ceiling conc.); 500 ppm (maximum conc.).
- ACGIH Threshold Limit Value (TLV):
50 ppm (TWA) skin, A4 - Not Classifiable as a Human Carcinogen.

Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.
WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.

Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

---

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.

Odor:
Aromatic benzene-like.

Solubility:
0.05 gm/100gm water @ 20C (68F).

Specific Gravity:
0.86 @ 20C / 4 C

pH:
No information found.

% Volatiles by volume @ 21C (70F):
100

Boiling Point:
111C (232F)

Melting Point:
-95C (-139F)

Vapor Density (Air=1):
3.14

Vapor Pressure (mm Hg):
22 @ 20C (68F)
Evaporation Rate (BuAc=1):
2.24

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage. Containers may burst when heated.
Hazardous Decomposition Products:
Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Oral rat LD50: 636 mg/kg; skin rabbit LD50: 14100 uL/kg; inhalation rat LC50: 49 gm/m3/4H; Irritation data: skin rabbit, 500 mg, Moderate; eye rabbit, 2 mg/24H, Severe. Investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
Has shown some evidence of reproductive effects in laboratory animals.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Toluene (108-88-3)	No	No	3

12. Ecological Information

Environmental Fate:
When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. This material has a log octanol-water partition coefficient of less than 3.0. Bioconcentration factor = 13.2 (eels).
Environmental Toxicity:
This material is expected to be toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TOLUENE
Hazard Class: 3
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

International (Water, I.M.O.)

Proper Shipping Name: TOLUENE
Hazard Class: 3.2
UN/NA: UN1294
Packing Group: II
Information reported for product/size: 390LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
Toluene (108-88-3)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\---------------------------------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Toluene (108-88-3)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Toluene (108-88-3)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Toluene (108-88-3)	1000	U220	No

```
Chemical Weapons Convention:  No     TSCA 12(b):  No     CDTA:  Yes
SARA 311/312:  Acute: Yes      Chronic: Yes  Fire: Yes Pressure: No
Reactivity: No          (Pure / Liquid)
```

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM.

Australian Hazchem Code: 3[Y]E
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
POISON! DANGER! HARMFUL OR FATAL IF SWALLOWED. HARMFUL IF INHALED OR ABSORBED THROUGH SKIN. VAPOR HARMFUL. FLAMMABLE LIQUID AND VAPOR. MAY AFFECT LIVER, KIDNEYS, BLOOD SYSTEM, OR CENTRAL NERVOUS SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT.
Label Precautions:
Keep away from heat, sparks and flame.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid breathing vapor.
Avoid contact with eyes, skin and clothing.
Label First Aid:
Aspiration hazard. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If vomiting occurs, keep head below hips to prevent aspiration into lungs. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician immediately.
Product Use:
Laboratory Reagent.
Revision Information:
No changes.
Disclaimer:
****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR

IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

Please reduce your browser font size for better viewing and printing.

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

MALLINCKRODT J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300

National Response in Canada
CANUTEC: 613-996-6666

Outside U.S. and Canada
Chemtrec: 202-483-7616

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance.

XYLENES

MSDS Number: X2000 --- *Effective Date: 09/08/97*

1. Product Identification

Synonyms: Dimethyl benzene, xylol, methyltoluene
CAS No.: 1330-20-7
Molecular Weight: 106.17
Chemical Formula: C6H4(CH3)2
Product Codes:
J.T. Baker: 5377, 5810, 5813, 9483, 9489, 9490, 9493, 9494, 9499, 9516, X516
Mallinckrodt: 8664, 8668, 8671, 8672, 8685, 8802, V052

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
m-Xylene	108-38-3	40 - 65%	No
o-Xylene	95-47-6	15 - 20%	No
p-Xylene	106-42-3	< 20%	No
Ethyl Benzene	100-41-4	15 - 25%	Yes

3. Hazards Identification

Emergency Overview

DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS.

FLAMMABLE LIQUID AND VAPOR.

J.T. Baker SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 2 - Moderate
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 0 - None
Contact Rating: 2 - Moderate
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER.
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Inhalation of vapors may be irritating to the nose and throat. Inhalation of high concentrations may result in nausea, vomiting, headache, ringing in the ears, and severe breathing difficulties which may be delayed in onset. Substernal pain, cough, and hoarseness are also reported. High vapor concentrations are anesthetic and central nervous system depressants.
Ingestion:
Ingestion causes burning sensation in mouth and stomach, nausea, vomiting and salivation. Minute amounts aspirated into the lungs can produce a severe hemorrhagic pneumonitis with severe pulmonary injury or death.
Skin Contact:
Skin contact results in loss of natural oils and often results in a characteristic dermatitis. May be absorbed through the skin.
Eye Contact:
Vapors cause eye irritation. Splashes cause severe irritation, possible corneal burns and eye damage.
Chronic Exposure:
Chronic inhalation can cause headache, loss of appetite, nervousness and pale skin. Repeated or prolonged skin contact may cause a skin rash. Repeated exposure of the eyes to high concentrations of vapor may cause reversible eye damage. Repeated exposure can damage bone marrow, causing low blood cell count. May damage the liver and kidneys.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders or eye problems, or impaired liver, kidney, blood, or respiratory function may be more susceptible to the effects of the substance.

---

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.
Ingestion:
Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately.
Skin Contact:
Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before

reuse. Thoroughly clean shoes before reuse.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Flash point: 29C (84F) CC
Autoignition temperature: 464C (867F)
Flammable limits in air % by volume:
lel: 1.0; uel: 7.0
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Contact with strong oxidizers may cause fire. Sealed containers may rupture when heated. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, foam or carbon dioxide. Water spray may be used to keep fire exposed containers cool, dilute spills to nonflammable mixtures, protect personnel attempting to stop leak and disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Vapors can flow along surfaces to distant ignition source and flash back.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! If a leak or spill has not ignited, use water spray to disperse the vapors, to protect personnel attempting to stop leak, and to flush spills away from exposures. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

J. T. Baker SOLUSORB(R) solvent adsorbent is recommended for spills of this product.

7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Containers of this material may be hazardous when empty since they retain product residues (vapors,

liquid); observe all warnings and precautions listed for the product. Do Not attempt to clean empty containers since residue is difficult to remove. Do not pressurize, cut, weld, braze, solder, drill, grind or expose such containers to heat, sparks, flame, static electricity or other sources of ignition: they may explode and cause injury or death.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
100 ppm (TWA) xylene
100 ppm (TWA) ethylbenzene
-ACGIH Threshold Limit Value (TLV):
100 ppm (TWA) 150 ppm (STEL) xylene
Carcinogen Category (xylene): A4
100 ppm (TWA) 125 ppm (STEL) ethyl benzene
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details. Use explosion-proof equipment.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded, a half-face organic vapor respirator may be worn for up to ten times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. A full-face piece organic vapor respirator may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face piece positive-pressure, air-supplied respirator.
WARNING: Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

The following physical data is for xylene.
Appearance:
Clear, colorless liquid.
Odor:
Characteristic odor.
Solubility:
Insoluble in water.
Specific Gravity:
0.86 @ 20C/4C
pH:
Not applicable.

% Volatiles by volume @ 21C (70F):
100
Boiling Point:
137 - 140C (279 - 284F)
Melting Point:
-25C (-13F)
Vapor Density (Air=1):
3.7
Vapor Pressure (mm Hg):
8 @ 20C (68F)
Evaporation Rate (BuAc=1):
0.7

10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Involvement in a fire causes formation of carbon monoxide and unidentified organic components.
Hazardous Polymerization:
Will not occur.
Incompatibilities:
Strong oxidizing agents and strong acids.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

11. Toxicological Information

Toxicological Data:
Xylene: oral rat LD50: 4300 mg/kg; inhalation rat LC50: 5000 ppm/4H; skin rabbit LD50: > 1700 mg/kg; Irritation eye rabbit: 87 mg mild (Std. Draize); irritation skin rabbit 500 mg/24 moderate (Std. Draize); investigated as a tumorigen, mutagen, reproductive effector.
Ethyl benzene: oral rat LD50: 3500 mg/kg; skin rabbit LD50: 17800 uL/kg; investigated as a tumorigen, mutagen, reproductive effector.
Reproductive Toxicity:
May cause teratogenic effects.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
m-Xylene (108-38-3)	No	No	3
o-Xylene (95-47-6)	No	No	3
p-Xylene (106-42-3)	No	No	3
Ethyl Benzene (100-41-4)	No	No	None

12. Ecological Information

Environmental Fate:
Following data for xylene: When released into the soil, this material may evaporate to a moderate extent. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material may biodegrade to a moderate extent. When released into water, this material may evaporate to a moderate extent. When released into water, this material may biodegrade to a moderate extent. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life of less than 1 day. This material is not expected to significantly bioaccumulate. (mixed xylenes: octanol / water partition coefficient 3.1 - 3.2; bioconcentration factor = 1.3, eels)
Environmental Toxicity:
For xylene: This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: XYLENES
Hazard Class: 3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

International (Water, I.M.O.)

Proper Shipping Name: XYLENES
Hazard Class: 3.3
UN/NA: UN1307
Packing Group: III
Information reported for product/size: 398LB

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\---------------------------------

Ingredient	TSCA	EC	Japan	Australia
m-Xylene (108-38-3)	Yes	Yes	Yes	Yes
o-Xylene (95-47-6)	Yes	Yes	Yes	Yes

p-Xylene (106-42-3)	Yes	Yes	Yes	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
m-Xylene (108-38-3)	Yes	Yes	No	Yes
o-Xylene (95-47-6)	Yes	Yes	No	Yes
p-Xylene (106-42-3)	Yes	Yes	No	Yes
Ethyl Benzene (100-41-4)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
m-Xylene (108-38-3)	No	No	Yes	No
o-Xylene (95-47-6)	No	No	Yes	No
p-Xylene (106-42-3)	No	No	Yes	No
Ethyl Benzene (100-41-4)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
m-Xylene (108-38-3)	1000	No	No
o-Xylene (95-47-6)	1000	No	No
p-Xylene (106-42-3)	100	No	Yes
Ethyl Benzene (100-41-4)	1000	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Mixture / Liquid)

Australian Hazchem Code: 3[Y]
Poison Schedule: No information found.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

---

16. Other Information

NFPA Ratings: Health: **2** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
DANGER! HARMFUL OR FATAL IF SWALLOWED. VAPOR HARMFUL. AFFECTS CENTRAL NERVOUS SYSTEM. CAUSES SEVERE EYE IRRITATION. CAUSES IRRITATION TO SKIN AND RESPIRATORY TRACT. MAY BE HARMFUL IF ABSORBED THROUGH SKIN. CHRONIC EXPOSURE CAN CAUSE ADVERSE LIVER, KIDNEY, AND BLOOD EFFECTS. FLAMMABLE LIQUID AND VAPOR.
Label Precautions:
Keep away from heat, sparks and flame.
Avoid contact with eyes, skin and clothing.
Keep container closed.
Use only with adequate ventilation.

Avoid breathing vapor.
Wash thoroughly after handling.

Label First Aid:

Aspiration hazard. If swallowed, vomiting may occur spontaneously, but DO NOT INDUCE. If vomiting occurs, keep head below hips to prevent aspiration into lungs. Never give anything by mouth to an unconscious person. Call a physician immediately. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases get medical attention immediately.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 15.

Disclaimer:

****

Mallinckrodt Baker, Inc. provides the information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. MALLINCKRODT BAKER, INC. MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THE INFORMATION SET FORTH HEREIN OR THE PRODUCT TO WHICH THE INFORMATION REFERS. ACCORDINGLY, MALLINCKRODT BAKER, INC. WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE UPON THIS INFORMATION.

****

Prepared by: Strategic Services Division
Phone Number: (314) 539-1600 (U.S.A.)

APPENDIX B
SPECIFIC HEALTH AND SAFETY PROCEDURES

NOTE: IT health and safety procedures that will be utilized during the project are listed below. A copy of the IT Group Health and Safety Procedures HS001-999 will be maintained on site to augment this HASP.

HS020	Accident Prevention Program: Reporting Investigation and Review
HS021	Accident Prevention Program: Management Safety Reviews
HS051	Tailgate Safety Meeting
HS106	First Aid Kits
HS060	Hazard Communication Program
HS303	Pressurized Cleaning and Cutting Equipment
HS307	Excavation and Trenching
HS309	Underground Storage Tank Removal
HS400	Working in Hot Environments
HS600	Personal Protection Program
HS601	Respiratory Protection
HS800	Motor Vehicle Operation: General Requirements

APPENDIX C
SAFETY PLAN ACKNOWLEDGEMENT

WORKER ACKNOWLEDGEMENT TO HEALTH-AND-SAFETY PLAN

I HAVE READ THE SITE-SAFETY PLAN FOR THIS SITE AND FULLY UNDERSTAND ITS CONTENTS.

Name	Date

APPENDIX D
ACTIVITY HAZARD ANALYSES
(JOB SAFETY ANALYSES)

JOB SAFETY ANALYSIS FOR SITE PREPARATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Equipment/ Facility Set-up	Slips, Trips, Falls	• Clear walkways work areas of equipment, tools, vegetation, excavated material and debris • Mark, identify, or barricade other obstructions		
	Spills	• Clean up spills before initiating maintenance • Review maintenance procedures for safety practices		
	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Follow hand signals of ground workers for equipment manipulation when placing/loading equipment into bucket. • Step away from equipment when bucket adjustments are made • Do not attempt verbal communication in high noise backgrounds.	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
	Pinch points	• Review equipment adjustment procedures, identify pinch points • Isolate/block pinch points to limit motion when inserting pins, fasteners, closing tackles	Leather gloves	
	Equipment failure	• Perform daily maintenance inspections on operating equipment		

JOB SAFETY ANALYSIS FOR SITE PREPARATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Equipment/facility set-up (continued)	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with OHM Health and Safety Procedures # 6-4	Lockout/Tagout Devices	Voltage Meter or Tic Tracer
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. Maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Avoid manual lifting/carrying tasks		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition	Leather gloves	

JOB SAFETY ANALYSIS FOR SITE PREPARATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Equipment/facility setup (continued)	Ladders	• Inspect ladders before use for mud buildup on treads • Clean mud from boots before climbing on ladders • Follow the three point of contact rule		
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists to exceed 85 dB A TWA	Ear plugs	Sound Level Meter
	Burns associated with loading/unloading equipment on trucks	• Identify heavy objects for loading that may have hot surfaces • Allow objects to cool or cover hot surfaces with non-combustible material to protect workers from buns		
	Walking on machine tracks	• Avoid walking on machine tracks whenever possible; clean tracks for safe walking/working surfaces • Observe track surfaces when walking, move cautiously on uneven, slippery surfaces • Avoid sudden awkward motions (pulling/jerking fuel hoses)		
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 3-4, 3-5 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

JOB SAFETY ANALYSIS FOR SECURITY FENCE INSTALLATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Fence Installation	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, vegetation, excavated material, and debris • Mark, identify, or barricade other obstructions		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads		•
	Eye Injuries	• Wear face shield, goggles when operating powered clearing / grubbing equipment	Goggles and face shield	•
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	• Sound Level Meter
	Overexertion	• Use the right tool for the task at hand • Avoid actions/activities that produce overexertion		•
	Horseplay	• Prohibit horseplay at all project sites • Review rules about horseplay with subcontractor • supervisors and workers • Remind workers not to respond/participate in horseplay • started by others		•

JOB SAFETY ANALYSIS FOR SECURITY FENCE INSTALLATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Fence Installation (continued)	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with OHM Health and Safety Procedures # 6-4	Lockout-Tagout Devices	• Voltage Meter or "Tic" Tracer
	Allergic Reaction	• Review allergy hazards with work crew • Identify workers with allergies • Review work assignments PPE upgrades	Tyvek coveralls, duct tape bottom of coveralls to boots; latex gloves, if required	•
	Insect Stings	• Avoid hand mowing/clearing in dense brush areas, • suspected Areas of stinging insects	Leather gloves, chaps	•

JOB SAFETY ANALYSIS FOR SECURITY FENCE INSTALLATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Fence Installation (continued)	Contact with Poison Ivy	• Identify workers who are known to contract poison ivy • Wear PPE and tape joints to keep poison ivy irritants/ plant matter away from skin • Use protective creams and wash with poison ivy preventing soaps when working in suspected exposure area	Long sleeve shirts, Tyvek coveralls, Leather gloves	•
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	• Meteorological Equipment

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Clearing and Grubbing	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Step away from equipment when bucket adjustments are made. • Do not attempt verbal communication in high noise backgrounds • Park equipment in areas where operator can clearly see to dismount equipment	Warning vests, hard hat, safety glasses, steel toe work boots	
	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Exit equipment slowly and maintain three point contact • Clean boot soles before climbing on equipment		
	Walking on Machine Tracks	• Avoid walking on machine tracks whenever possible; clean tracks for safe walking/working surfaces • Observe track surfaces when walking, move cautiously on uneven, slippery surfaces • Avoid sudden awkward motions (pulling/jerking fuel lines)		

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Clearing and Grubbing (continued)	Handling Heavy Objects	• Observe proper lifting techniques • Review proper lifting posture/techniques regularly at safety meetings • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Warm up muscles before engaging in manual lifting • Avoid rushing, placing torque on objects being sawed		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Observe work area and location of other personnel before lifting/moving objects with sharp edges	Leather gloves	
	Insect/ Snake Bites	• Review injury potential and types of snakes with workers • Avoid insect nests areas, likely habitats of snakes outside work areas • Emphasize "Buddy System" where such injury potential exists • Use insect repellant, wear PPE to protect against sting/bite injuries. • Avoid hand mowing/clearing in dense brush areas, • suspected areas of stinging insects	Leather gloves, Chaps	

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Clearing and Grubbing (continued)	Contact Dermatitis/ Poison Ivy	• Wear PPE to avoid skin contact with contaminated soil, plants, or other skin irritants (See Section 5.0 HASP) • Identify and review poisonous plants with workers • Identify workers who are known to contract poison ivy • Wear PPE and tape joints to keep poison ivy irritants/ plant matter away from skin • Use protective creams and wash with poison ivy preventing soaps when working in suspected exposure areas	Tyvek coveralls, duct tape bottom of coveralls to boots or latex boot covers, leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 3-4, 3-5 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment
Excavation of Soil	Underground/Overhead Utilities	• Identify all utilities around the site before work commences • Cease work immediately if unknown utility markers are uncovered • Use manual excavation within 3 feet of known utilities • Utility clearance shall conform with 29 CFR 1926.955 (high voltage >700 kv) 15 feet phase to ground clearance; 31 feet phase to phase clearance		

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Excavation of Soil (continued)	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Step away from equipment when bucket adjustments • are made. • Do not attempt verbal communication in high noise • backgrounds • Park equipment in areas where operator can see clearly • to dismount equipment • Report minor incidents to site supervisor		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Observe work area and location of other personnel before lifting/moving objects with sharp edges	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Excavation of Soil (continued)	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Exit equipment slowly and maintain three point contact • Clean boot soles before climbing on equipment		
	Handling Heavy Objects	• Observe proper lifting techniques • Review proper lifting posture/techniques regularly at safety meetings • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder level • Warm up muscles before engaging in manual lifting	Warning vests, hard hat, safety glasses, steel toe work boots	
	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants • Dampen soil using light water spray to prevent fugitive dust emissions • Cover stockpiled soil with plastic sheeting to prevent fugitive dust emissions	Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (See Section 5.0 HASP)	LEL/O_2, PID

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Excavation of soil (continued)	Excavation Wall Collapse	• Construct diversion ditches or dikes to prevent surface water from entering excavation • Provide good drainage of area adjacent to excavation • Collect ground water/rain water from excavation and dispose of properly • Store excavated material at least 2 feet from the edge of the excavation; prevent excessive loading of the excavation face • Provide sufficient stairs, ladders, or ramps when workers enter excavations over 4 feet in depth • Place ladders no more than 25 feet apart laterally • Treat excavations over 4 feet deep as confined spaces • Complete confined space permit entry procedure • Monitor atmosphere for flammable/toxic vapors, and oxygen deficiency • Slope, bench, shore, or sheet excavations over 5 feet deep if worker entry is required • Assign a competent person to inspect, decide soil classification, proper sloping, the correct shoring, or sheeting • Inspect excavations (when personnel entry is required) daily, any time conditions change • Provide at least two means of exit for personnel working in excavations	Hard hat, safety glasses	
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with OHM Health and Safety Procedures # 3-4, 3-5 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Manual Excavation	Struck/Struck By	• Use the right tool for the task at hand • Maintain personal balance when performing manual excavation • Concentrate on the work task being performed		
	Overexertion	• Use the right tool for the task at hand • Avoid actions/activities that produce overexertion		
	Horseplay	• Prohibit horseplay on all project sites • Review rules about horseplay with subcontract supervisors and workers • Remind workers not to respond/participate in horseplay started by others		
Backfilling	Slips, Trips, Falls	• Clear, walkways of equipment, vegetation, excavated material, tools and debris • Mark, identify, or barricade other obstructions • Exit equipment slowly and maintain three point contact • Clean boot soles before climbing on equipment		
	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Step away from equipment when bucket adjustments are made. • Do not attempt verbal communication in high noise backgrounds • Park equipment in areas where operator can see clearly to dismount equipment • Report minor incidents to site supervisor	Warning vests, hard hat safety glasses, steel toe work boots	

JOB SAFETY ANALYSIS FOR SOIL EXCAVATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Backfilling (continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Observe work area and location of other personnel before lifting/moving objects with sharp edges	Leather gloves	

JOB SAFETY ANALYSIS FOR SOIL AND CONTAINER SAMPLING				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Soil and Container Sampling	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Review handling/use of sharp tools before work activities begin • Prohibit use of sharp tools above shoulder height	Leather gloves	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid carrying heavy objects above shoulder height • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		
	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, vegetation, excavated material, and debris • Mark, identify, or barricade other obstructions		

JOB SAFETY ANALYSIS FOR SOIL AND CONTAINER SAMPLING				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Soil and Container Sampling (continued)	Inhalation and Contact with Hazardous Substances	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants • Maintain the buddy system in areas where sudden releases of toxic vapors may occur (lagoon sludge basins)	Tyvek coveralls, latex or neoprene boots, nitrile gloves (see Section 5.0 HASP)	LEL/O_2, PID, Mini-RAM, Air Sampling Pump
	Operation of hand tools	• Review power/pneumatic tool operation before staring work • Maintain steady even pressure when drilling into concrete or hard material • Avoid actions that cause overexertion or binding of drills		
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with IT Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

JOB SAFETY ANALYSIS FOR SOIL LOADOUT AND DISPOSAL				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Soil Loadout and Disposal	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Obey posted speed limits • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Exit equipment slowly and maintain three point contact • Report minor incidents to site supervision • Park equipment in areas where operator can see clearly to dismount equipment • Step away from equipment when bucket adjustments are made • Do not attempt verbal communication in high noise backgrounds • Follow hand signals of ground workers for equipment manipulation when placing/loading equipment into loader bucket.	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
	Slips, Trips, Falls	• Clear walk ways, work areas of equipment, tools and debris • Mark, identify, or barricade other obstructions • Clean mud from boots before climbing on equipment		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	

JOB SAFETY ANALYSIS FOR SOIL LOADOUT AND DISPOSAL				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Soil Loadout and Disposal (continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar motions • Assure guards are in place to protect from these parts of equipment during operation • Wear proper work gloves when the possibility of pinching, or other injury may be caused by moving/ handling large or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • Avoid moving hydraulic, dump or loading equipment • Isolate/block pinch points to limit motion when inserting pins, closing tackles, ect.		
	Walking on machine tracks	• Avoid walking on machine tracks whenever possible; clean tracks for safe walking/working surfaces • Observe track surfaces when walking, move cautiously on uneven, slippery surfaces • Avoid sudden awkward motions (pulling/jerking fuel hoses)		

JOB SAFETY ANALYSIS FOR SOIL LOADOUT AND DISPOSAL				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Soil Loadout and Disposal (continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. Maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avid carrying heavy objects above shoulder level • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		
	Defective Vehicles	• Inspect all trucks before loading • Do not load soil or equipment into defective equipment		
	Roadways	• Ensure that the roadways on the route to the landfill or final destination are designed to handle the weight of the vehicles and allow HAZMAT materials		
	Horseplay	• Prohibit horseplay on all project sites • Review rules about horseplay with subcontractor supervisors and workers • Remind workers not to respond/participate in horseplay stared by others		
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with IT Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Equipment Decontamination	Slips, Trips, Falls	• Clear walkways, work areas of equipment, vegetation, tools and debris • Mark, identify, or barricade other obstructions • Clean heavy objects of oil/grease or other slippery contamination before attempting to lift/remove • Wear gloves with grip improving surfaces for handling large, slippery objects • Clean up spills or water accumulation in walkways		
	Struck by/Against Heavy Equipment, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Step away from equipment when bucket adjustments are made • Do not attempt verbal communication in high noise backgrounds	Warning vests hard hat safety glasses, goggles and face shield, steel toe work boots	
	Inhalation and Contact with Hazardous Substances, & Splashes	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Wear hard hats, safety glasses with side shields, or goggles with splash shields and steel-toe safety boots	PVC rain suit or Tyvek coveralls, nitrile or latex gloves, neoprene or latex boots (See Section 5.0 HASP)	

JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Equipment Decontamination (Continued)	Burns	• Wear proper gloves, face shield/safety goggles, shin and toe guards, and splash suits to protect workers from skin burns and injury when operating laser (high pressure washers) • Tape gloves to PPE sleeves to lessen the possibility of hat water entering gloves • Use hand tools to loosen connections and position body to avoid pressure discharge • Wear shin and toe guards to protect from burns, lacerations and similar injuries	Goggles and face shield, shin and toe guards	
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		

JOB SAFETY ANALYSIS FOR EQUIPMENT DECONTAMINATION				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Equipment Decontamination (Continued)	Sharp Objects/ Cuts and Punctures	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges/objects or working with hand tools • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Guard or pad metal edges of objects frequently used (access panels, etc.) or manipulated/bypassed during maintenance • Position heavy objects to avoid manipulation while cleaning • Get assistance and dry glove surfaces to improve grip during object manipulation while cleaning	Leather gloves	
	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Repetitive Strains	• Rotate job tasks on high vibration equipment • Report equipment that produces high vibration for inspection and maintenance • Wear vibration reducing gloves		
	Strains and Sprains	• Maintain a safe stance and body position operating pressurized equipment • Avoid rushing		
	High/Low Ambient Temperature	• Monitor for Heat/Cold stress in accordance with IT Health and Safety Procedures # HS400, HS401 • Provide fluids to prevent worker dehydration	Insulated Clothing (subject to ambient temperature)	Meteorological Equipment

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Grading	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, debris, excavated material • Mark, identify, or barricade other obstructions • Identify defective equipment and remove from service		
	Fire	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit Smoking • Provide ABC (or equivalent) fire extinguishers for all work, flammable storage areas, fuel powered generators and compressors • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, secured, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum	Portable fire extinguishers	LEL/O_2

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Grading (continued)	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel during paving activities • Wear hard hats, safety glasses with side shields, face shields and goggles and steel-toe safety boots at all times • Understand and review hand signals • Exit equipment slowly and maintain three point contact • Report minor incidents to site supervisor	Warning vests, hard hat safety glasses, goggles and face shield, steel toe work boots	
Concrete Slab Formation	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, debris, excavated material • Mark, identify, or barricade other obstructions • Identify defective equipment and remove from service • Inspect work boots regularly-Replace when soles become worn • Wear steel toe safety boots for all construction activities		

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Concrete slab formation (continued)	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel during paving activities • Wear hard hats, safety glasses with side shields, face shields and goggles and steel-toe safety boots at all times • Understand and review hand signals • Exit equipment slowly and maintain three point contact • Report minor incidents to site supervisor	Warning vests, hard hat, safety glasses, steel toe work boots	
	Inhalation and Contact with Concrete Dust	• Provide workers proper skin, eye and respiratory protection based on the exposure hazards present • Review hazardous properties of site contaminants with workers before operations begin • Monitor breathing zone air to determine levels of contaminants	Tyvek coveralls, nitrile gloves, neoprene or latex boots (See Section 5.0 HASP)	LEL/O_2, PID
	Operation of Hand Tools	• Review power/pneumatic tool operation before starting work • Maintain steady even pressure when drilling into concrete/hard materials • Avoid actions that cause over exertion or binding of drills		

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Concrete slab formation (continued)	Operation of Hand Tools	• Review power/pneumatic tool operation before starting work • Maintain steady even pressure when drilling into concrete/hard materials • Avoid actions that cause over exertion or binding of drills		
FCR/LFTU Construction/ Placement	Struck by/ Against Heavy Equipment, Flying Debris, Protruding Objects	• Wear reflective warning vests when exposed to vehicular traffic • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Barricade or enclose the work area • Restrict entry to the work area to authorized personnel during paving activities • Wear hard hats, safety glasses with side shields, face shields and goggles and steel-toe safety boots at all times • Understand and review hand signals • Exit equipment slowly and maintain three point contact • Report minor incidents to site supervisor	Warning vests, hard hat, safety glasses	

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
FCR/LFTU Construction/ Placement (continued)	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, construction debris, and other materials • Mark, identify, or barricade other obstructions • Evaluate fall hazards above 4 ft.; use fall protection equipment (harness/lanyard), standard guardrails or other fall protection systems when working on elevated platforms above 6 ft. • Use "heavy duty industrial" (type IA) ladders • Install and inspect scaffolds according to manufacturers requirements • Only trained operators are permitted to use aerial lifts • Tie-off all straight/extension ladders or manually hold by co-worker at base • Anchorage points for fall arrest systems must support at least 5,400 pounds for each worker • Halt roof, exterior scaffold work in high winds, severe weather • Inspect work boots regularly-Replace when soles become worn • Wear steel toe safety boots for all construction activities		
	Welding	• Test atmosphere with combustible gas meter • Obtain Hot Work Permit from SS / SSO • Wear proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	face shield and goggles	LEL/O_2

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
FCR/LFTU Construction/ Placement (continued)	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads and/or use buddy system • Avoid carrying heavy objects above shoulder height • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting • Review lifting posture/techniques regularly at safety meetings		
	Caught In/ Between Moving Parts	• Identify and understand parts of equipment which may cause crushing, pinching, rotating or similar motions • Assure guards are in place to protect from these parts of equipment during operation • Provide and wear proper work gloves when the possibility of pinching, or other injury may be caused by moving/ handling large or heavy objects • Maintain all equipment in a safe condition • Keep all guards in place during use • De-energize and lock-out machinery before maintenance or service	Leather gloves	
	Horseplay	• Prohibit horseplay on all project sites • Review rules about horseplay with subcontractor supervisors and workers • Remind workers not to respond/participate in horseplay started by others		

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
FCR/LFTU Construction/ Placement (continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Inspect all electrical power circuits prior to commencing work • Follow Lockout-Tagout procedures in accordance with OHM Health and Safety Procedures # HS315	Lockout-Tagout Devices	Voltage Meter or "Tic" Tracer

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
FCR/LFTU Construction/ Placement (continued)	Structural Collapse	• Barricade or enclose the work areas • Restrict entry to authorized personnel only during construction activities • Wear hard hats, safety glasses with side shields, and steel-toe safety boots • Understand and review hand signals	Hard hat, Safety glasses, steel toe work boots	
	Hilti® Gun Activities	• Verify certification of all gun users before work activities begin • Follow Manufacturer's procedures for loading • Prohibit smoking, open flames during use of gun • Lock up gun and charges when not in use • Dispose of spent charges and charge packs at the end of each shift • Wear hearing protection when using gun	Ear Plugs, Safety glasses	Sound Level Meter
System Start up	Slips, Trips, Falls	• Clear walkways, work areas of equipment, tools, debris, excavated material • Mark, identify, or barricade other obstructions • Identify defective equipment and remove from service • Inspect work boots regularly-Replace when soles become worn • Wear steel toe safety boots for all construction activities	Body harnesses/ lanyard (elevated platforms above 6 ft.)	
	Struck by/ Against Falling, Flying Debris, Protruding Objects	• Wear hard hats, safety glasses with side shields, and steel-toe safety boots at all times • Secure building materials not in immediate use	Warning vests, hard hat, safety glasses, goggles and face shield, steel toe work boots	

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
System Start-up (continued)	Horseplay	• Prohibit horseplay on all project sites • Review rules about horseplay with subcontractor supervisors and workers • Remind workers not to respond/participate in horseplay started by others		
	Operation of Hand Tools	• Review power/pneumatic tool operation before starting work • Maintain steady even pressure when drilling into concrete/hard materials • Avoid actions that cause over exertion or binding of drills		
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads and/or use buddy system • Avoid carrying heavy objects above shoulder height • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting • Review lifting posture/techniques regularly at safety meetings		

JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
System Start-up (continued)	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use • Review the use of sharp tools before work activities begin • Prohibit use of sharp tools above shoulder height	Leather gloves	
	Burns	• Use proper work gloves, face shield/safety goggles, and leather apron to protect workers from skin burns when welding, cutting, and burning	face shield and goggles	
	Fire/ Explosion	• Test atmospheres with combustible gas meter when working around flammable materials • Eliminate sources of ignition from the work area • Prohibit smoking • Provide ABC (or equivalent) fire extinguishers for all work areas, flammable storage areas, fuel powered generator and compressor locations • Store flammable liquids in well ventilated areas • Prohibit storage, transfer of flammable liquids in plastic containers • Post "NO SMOKING" signs • Store combustible materials away from flammables • Store all compressed gas cylinders upright, secure, caps in place when not in use • Separate Flammables and Oxidizers by 20 feet minimum	Portable fire extinguishers	LEL/O_2

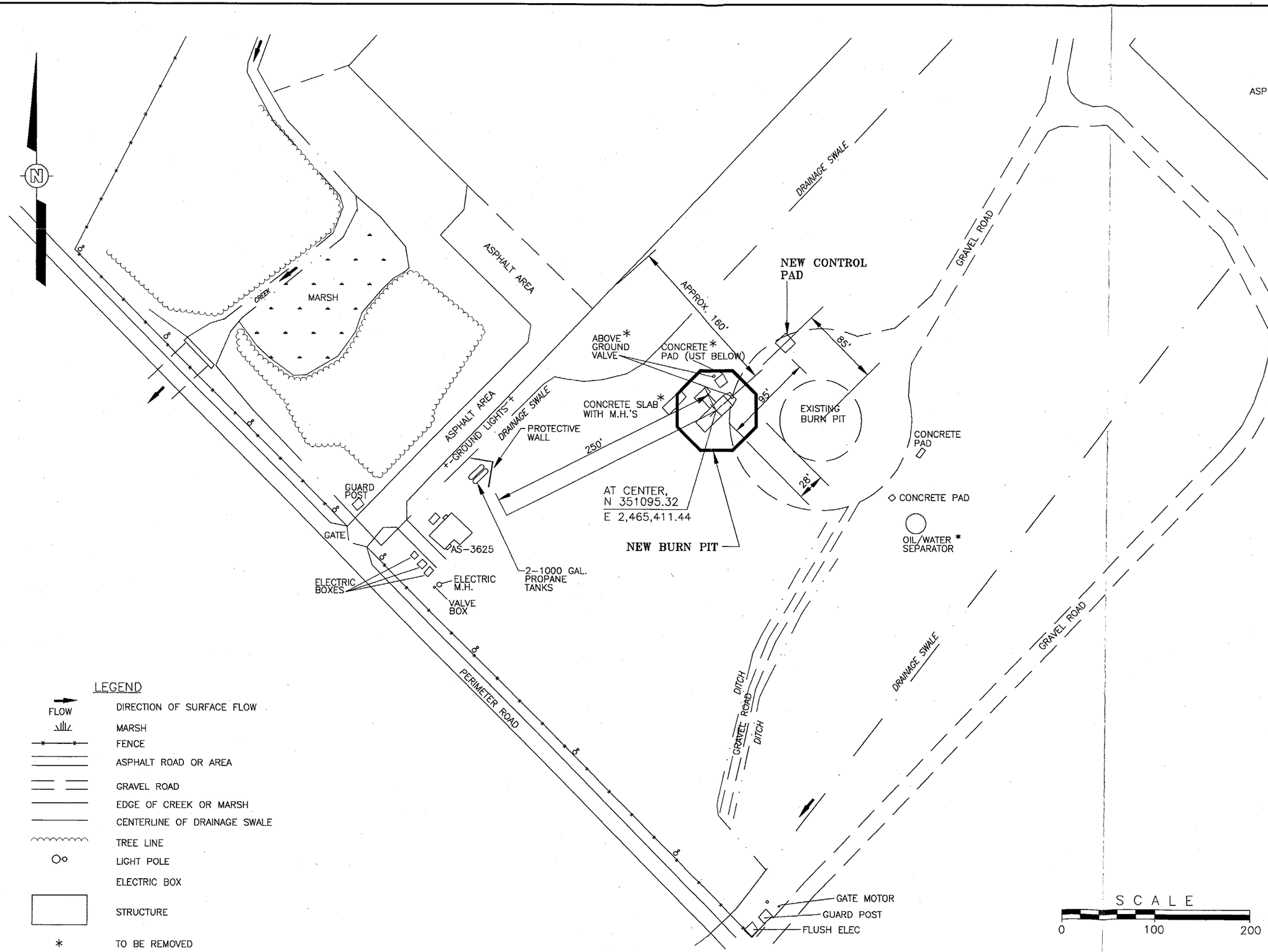
JOB SAFETY ANALYSIS FOR THE INSTALLATION AND START UP OF THE FCR/LFTU				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
System Start-up (continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Electrical Shock	• De-energize or shut off utility lines at their source before work begins • Use double insulated or properly grounded electric power-operated tools • Maintain tools in a safe condition • Inspect all electrical power circuits prior to commencing work • Provide an equipment-grounding conductor program or employ ground-fault circuit interrupters • Use qualified electricians to hook up electrical circuits • Inspect all extension cords daily for structural integrity, ground continuity, and damaged insulation • Cover or elevate electric wire or flexible cord passing through work areas to protect from damage • Keep all plugs and receptacles out of water • Use approved water-proof, weather-proof type if exposure to moisture is likely • Follow Lockout-Tagout procedures in accordance with OHM Health and Safety Procedures # 6-4	Lockout-Tagout Devices	Voltage Meter or "Tic" Tracer

JOB SAFETY ANALYSIS FOR TANK REMOVAL				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Tank Removal	Struck By/ Against Heavy Equipment	• Wear reflective warning vests when exposed to vehicular traffic • Obey posted speed limits • Isolate equipment swing areas • Make eye contact with operators before approaching equipment • Understand and review hand signals • Exit equipment slowly and maintain three point contact • Report minor incidents to site supervision • Park equipment in areas where operator can see clearly to dismount equipment • Step away from equipment when bucket adjustments are made • Do not attempt verbal communication in high noise backgrounds • Follow hand signals of ground workers for equipment manipulation when placing/loading equipment into loader bucket.	Warning vests, Hard hat, Safety glasses, Steel toe work boots	
	Slips, Trips, Falls	• Clear walk ways, work areas of equipment, tools and debris • Mark, identify, or barricade other obstructions • Clean mud from boots before climbing on equipment		
	Sharp Objects	• Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects • Maintain all hand and power tools in a safe condition • Keep guards in place during use	Leather gloves	

JOB SAFETY ANALYSIS FOR TANK REMOVAL				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Tank Removal (continued)	High Noise Levels	• Use hearing protection when exposed to excessive noise levels (greater than 85 dBA over an 8-hour work period) • Assess noise level with sound level meter if possibility exists that level may exceed 85dBA TWA	Ear plugs	Sound Level Meter
	Handling Heavy Objects	• Observe proper lifting techniques • Obey sensible lifting limits (60 lb. Maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads • Avid carrying heavy objects above shoulder level • Avoid actions/activities that contribute to overexertion • Warm up muscles before engaging in manual lifting activities • Review lifting posture/techniques regularly at safety meetings		
	Defective Vehicles	• Inspect all trucks before loading • Do not load soil or equipment into defective equipment		
	Roadways	• Ensure that the roadways on the route to the disposal area are designed to handle the weight of the vehicles		
	Horseplay	• Prohibit horseplay on all project sites • Review rules about horseplay with subcontractor supervisors and workers • Remind workers not to respond/participate in horseplay stared by others		

JOB SAFETY ANALYSIS FOR TANK REMOVAL				
Task Breakdown	**Potential Hazards**	**Critical Safety Practices**	**Personal Protective Clothing and Equipment**	**Monitoring Devices**
Tank Removal (continued)	Overhead Utilities	• Identify all utilities at the site before work commences • Utility clearance will meet 29 CFR 1926.955 15 feet phase to ground clearance; 31 feet phase to phase • Guard or de-energize electrical sources before crane operations begin		
	Rigging Equipment (if required to remove tank)	• Identify the proper rigging equipment for the type of lift • Inspect rigging devices to verify slings, chains, straps are free from defects and rated for the lift weight • Prohibit use of equipment with missing documentation tags, or defective equipment • Ensure tag-lines are free of knots and defects • Review rigging techniques, positioning of load, tag lines with workers involved in rigging activities		
	High/Low Ambient Temperature	• Monitor for Heat stress in accordance with IT Health and Safety Procedures # HS400 • Provide fluids to prevent worker dehydration		Meteorological Equipment
	Fire/ Explosion	• Test tank atmospheres with combustible gas meter prior to cutting • Complete Hot Work Permit in accordance with IT Health and Safety Procedure HS314 • Provide fire watch during cutting operations and for a minimum of 30 minutes after operations • Eliminate sources of ignition from the work area • Provide ABC (or equivalent) fire extinguishers in the cutting operation area		LEL/O_2

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	Atlanta, GA	776506-D-1-3



LEGEND

- FLOW — DIRECTION OF SURFACE FLOW
- MARSH
- FENCE
- ASPHALT ROAD OR AREA
- GRAVEL ROAD
- EDGE OF CREEK OR MARSH
- CENTERLINE OF DRAINAGE SWALE
- TREE LINE
- LIGHT POLE
- ELECTRIC BOX
- STRUCTURE
- * TO BE REMOVED

REVISIONS					
REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE

OHM Remediation Services Corp.
PROJECT NO. 776506

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	L. Shulman		

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
NAVAL STATION
ATLANTIC DIVISION
MARINE CORP BASE
CAMP LEJEUNE, N.C.

BURN PITS 9 AND 54

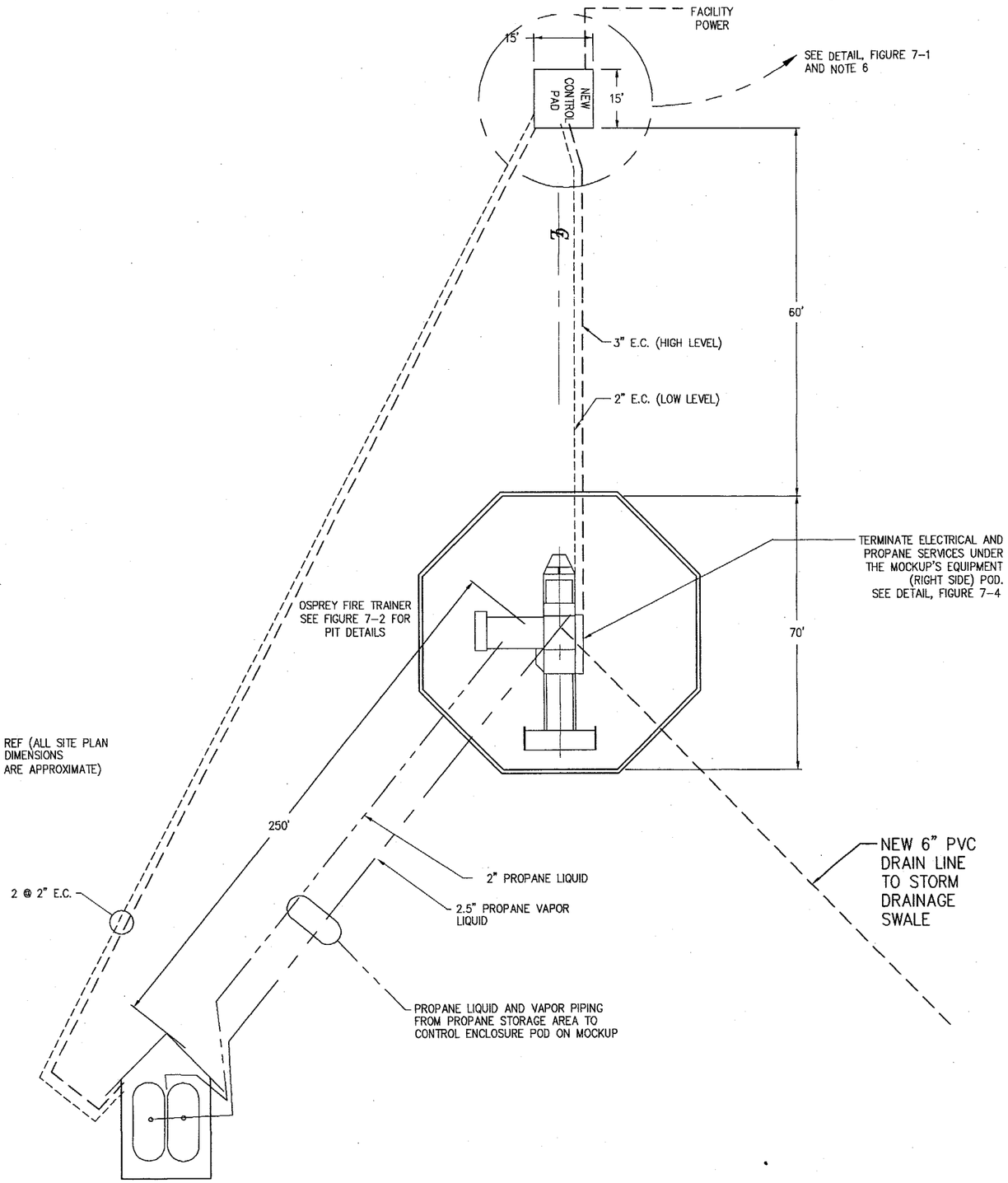
SITE MAP - SITE 54

SCALE:	SIZE:
AS SHOWN	D

DELIVERY ORDER NO. 0022
CONSTR. CONTRACT NO. N62470-97-D-5000
NAVFAC DRAWING NO. -
SHEET I.D. FIGURE 1-3

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

02590 D BIZ



NOTES:

1. THESE DRAWINGS DETAIL THE FACILITY REQUIREMENTS NECESSARY FOR THE INSTALLATION OF THE OSPREY FIRE TRAINER.

   PRIMARY ELEMENTS INCLUDE:

   THE PIT STRUCTURE INCLUDING ALL NECESSARY FOUNDATIONS, FOOTINGS FOR THE OSPREY MOCKUP, DRAINAGE, AND PROPANE AND ELECTRICAL TERMINATIONS

   THE PROPANE STORAGE AREA, INCLUDING TANKS, PUMP, SECURITY FENCE, AND ALL NECESSARY CONTROL AND SAFETY COMPONENTS DEFINED BY NFPA STANDARDS 54 AND 58 AND APPLICABLE LOCAL CODES.

   THE CONTROL PAD (SIZED FOR POSSIBLE FUTURE SHED OR AWNING).

   INTERCONNECTING PIPING AND CONDUITS

2. ALL RISERS AND ABOVE GRADE CONDUIT SHALL BE RIGID METAL CONDUIT, SIZED AND ROUTED AS SHOWN.

3. PROPANE PIPING SHALL BE INSTALLED AND PRESSURE TESTED IN ACCORDANCE WITH NFPA 54 AND 58. PROPANE PIPING SHALL BE STEEL PIPE WITH PROTECTIVE COATING AND WRAPPING. DOUBLE ENCASED UNDER ALL SLABS.

4. PROPANE PIPING SHALL BE FLUSHED AS NECESSARY TO ENSURE THAT ALL DEBRIS HAS BEEN CLEANED OUT.

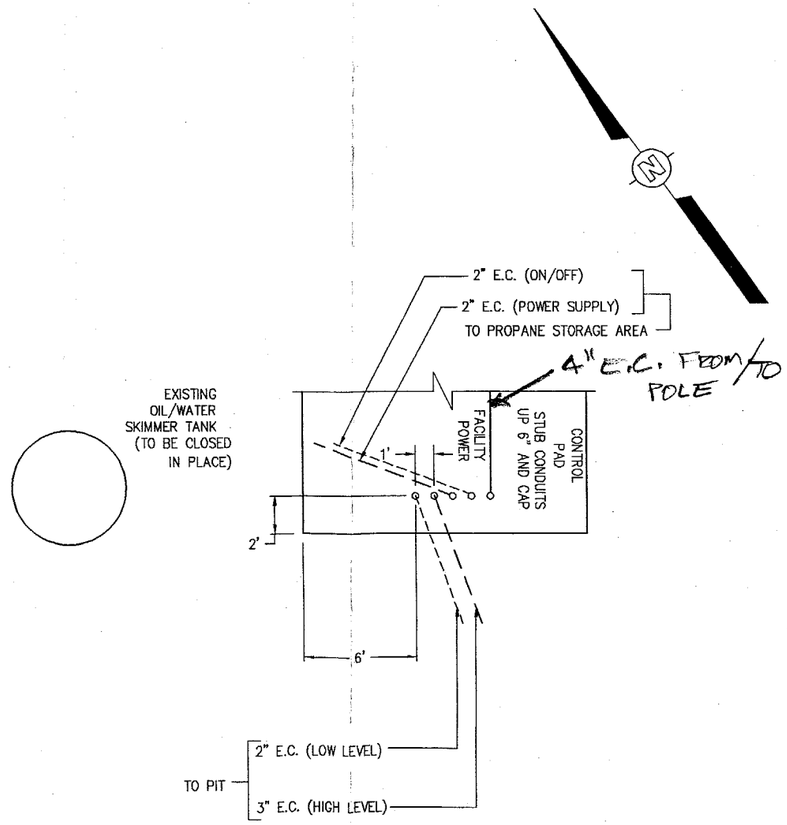
5. GRAVEL NOTES:

   GRAVEL SHALL BE CRUSHED STONE AND SHALL CONSIST OF IGNEOUS ROCK FROM ONE OF THE FOLLOWING CLASSIFICATIONS:
   *FINE GRAINED GRANITE, *DIABASE, *GABBRO, *BASALT, *RHYOLITE (QUARRY MAY REFER TO ROCK AS "TRAPROCK" OR "BLUESTONE")
   STONE SHALL BE CRUSHED AND PROVIDED AS SIZED AGGREGATE CONFORMING TO ASTM C33, GRADE 2:

SIEVE	SIZE
100%	3 INCHES
90–100%	2–1/2 INCHES
30–70%	2 INCHES
0–5%	3/4 INCHES

   SAMPLES TO BE FORWARDED TO SYMTRON SYSTEMS INC. FOR CONCURRENCE OF ORDER.

6. NEW CONTROL PAD: 15 FEET x 15 FEET–6INCH THICK, 4000 PSI CONCRETE WITH 6X6, 10 GAUGE WIRE MESH REINFORCEMENT.



NEW CONTROL PAD DETAIL

NOT TO SCALE

SOURCE: INFORMATION FROM SYMTRON SYSTEMS INC. DATED MARCH 31, 1999.

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	Atlanta, GA.	776506-D-7-1

REVISIONS

REV	DATE	BY	CHK'D	APPR'VD	DESCRIPTION/ISSUE

OHM Remediation Services Corp.
PROJECT NO. 776506

DESIGNED BY: J. Lange
DRAWN BY:
CHECKED BY:
APPROVED BY:

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
NAVAL STATION
MARINE CORP BASE
CAMP LEJEUNE, N.C.
ATLANTIC DIVISION
BURN PITS 9 AND 54
SITE 54 – OSPREY FIRE TRAINER

SCALE: AS SHOWN
SIZE: D
DELIVERY ORDER NO. 0022
CONSTR. CONTRACT NO. N62470-97-D-5000
NAVFAC DRAWING NO. –
SHEET I.D. FIGURE 7-1

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	Atlanta, GA.	776506-D-7-2

BURNER ELEMENT (TYP)
(BY SYMTRON)

ZONE 5

7'-0"

PILOT
3

ZONE 4

PILOT
2

SLOPE PIT
SURFACE
TO DRAIN

EQUIPMENT ENCLOSURE POD

3" EL.
2" EL.

2"

2.5"

3" EL.
2" EL.

6" PVC DRAIN
(SCREEN FOR DEBRIS)

70'-0"

ZONE 3

29'-0"

OSPREY MOCKUP

20'-0"

20'-0"

50'-0"

ZONE 2

PILOT
1

5'x16' BURNER ELEMENT,
5 TOTAL

ZONE 1

DRAIN LINE TO STORMWATER DITCH

SEE SECTION VIEW AT RIGHT

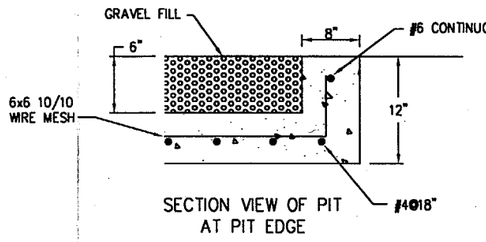
PIT, 6" DEEP AT EDGE,
GRAVEL FILLED, FLUSH WITH PAVEMENT,
SLOPE TO CENTER DRAIN

2.5" CARBON STEEL
PROPANE VAPOR FEED

2" CARBON STEEL
PROPANE LIQUID FEED

PIT NOTES:

1. PIT SHALL BE EIGHT SIDED (OCTAGON) AS SHOWN.
2. PIT SHALL BE 6" DEEP AT EDGE (CURB) AND SHALL SLOPE 1/8 INCH PER FOOT TO CENTER DRAIN.
3. OSPREY MOCKUP AND BURNER ELEMENTS ARE SHOWN FOR REFERENCE ONLY.
4. CONCRETE SHALL BE 4000 psi



SECTION VIEW OF PIT
AT PIT EDGE

NOT TO SCALE

SOURCE: INFORMATION FROM SYMTRON SYSTEMS INC. DATED MARCH 31, 1999.

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

REVISIONS				
DESCRIPTION/ISSUE	CHK'D/APRV'D	BY	DATE	REV

OHM Remediation Services Corp.
PROJECT NO. 776506

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	J. Lange		

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
NAVAL STATION
MARINE CORP BASE
CAMP LEJEUNE, N.C.
ATLANTIC DIVISION

BURN PITS 9 AND 54

SITE 54 - OSPREY FIRE TRAINER

SCALE:	SIZE:
AS SHOWN	D

DELIVERY ORDER NO.
0022

CONSTR. CONTRACT NO.
N62470-97-D-5000

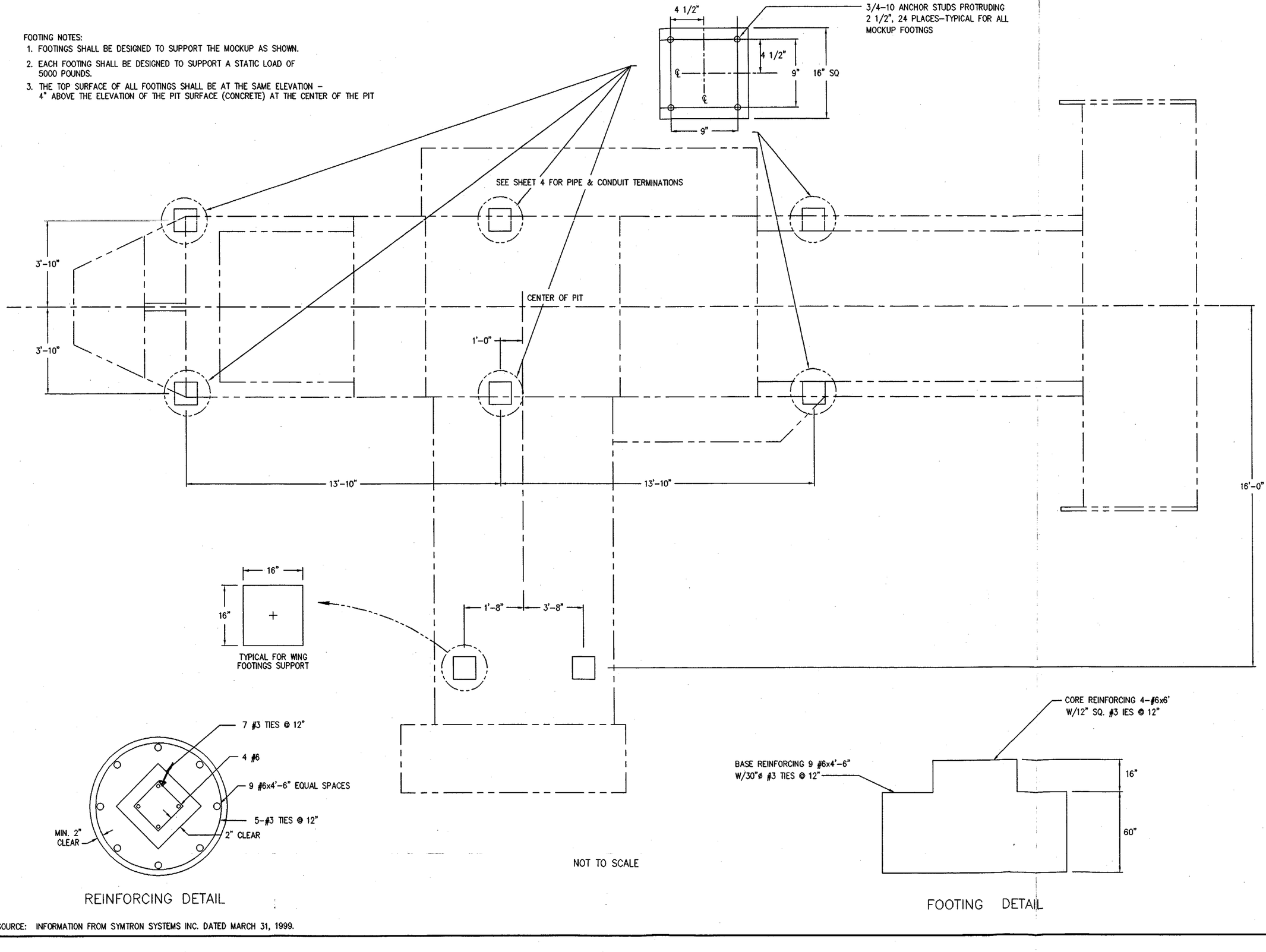
NAVFAC DRAWING NO.
-

SHEET I.D.
FIGURE 7-2

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	*Atlanta, GA.*	776506-D-7-3

FOOTING NOTES:

1. FOOTINGS SHALL BE DESIGNED TO SUPPORT THE MOCKUP AS SHOWN.
2. EACH FOOTING SHALL BE DESIGNED TO SUPPORT A STATIC LOAD OF 5000 POUNDS.
3. THE TOP SURFACE OF ALL FOOTINGS SHALL BE AT THE SAME ELEVATION – 4" ABOVE THE ELEVATION OF THE PIT SURFACE (CONCRETE) AT THE CENTER OF THE PIT



NOT TO SCALE

REINFORCING DETAIL

FOOTING DETAIL

SOURCE: INFORMATION FROM SYMTRON SYSTEMS INC. DATED MARCH 31, 1999.

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE

REVISIONS

OHM Remediation Services Corp.
PROJECT NO. 776506

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	J. Lange		

NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
NAVAL STATION
MARINE CORP BASE
CAMP LEJEUNE, N.C.

BURN PITS 9 AND 54

SITE 54 – OSPREY FIRE TRAINER

SCALE:	SIZE:
AS SHOWN	D

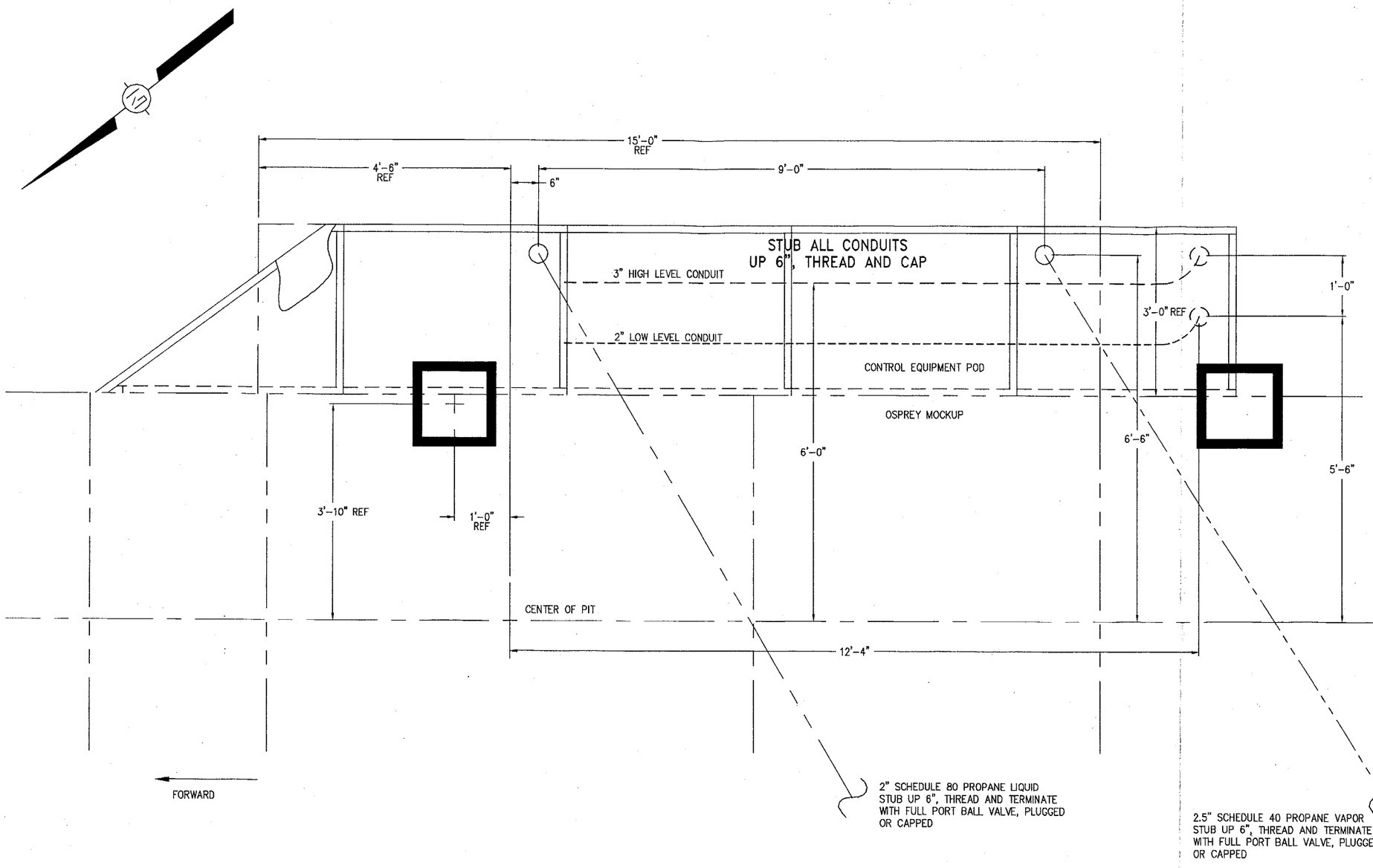
DELIVERY ORDER NO.
0022

CONSTR. CONTRACT NO.
N62470–97–D–5000

NAVFAC DRAWING NO.
–

SHEET I.D.
FIGURE 7–3

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	Atlanta, GA.	776506-D-7-4



NOT TO SCALE

SOURCE: INFORMATION FROM SYMTRON SYSTEMS INC. DATED MARCH 31, 1999.

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

REVISIONS					
REV	DATE	BY	CHK'D	APR'VD	DESCRIPTION/ISSUE

OHM Remediation Services Corp.
PROJECT NO. 776506

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	J. Lange		

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION
NORFOLK, VIRGINIA
NAVAL STATION
MARINE CORP BASE
CAMP LEJEUNE, N.C.

BURN PITS 9 AND 54

SITE 54 - OSPREY FIRE TRAINER

SCALE:	SIZE:
AS SHOWN	D

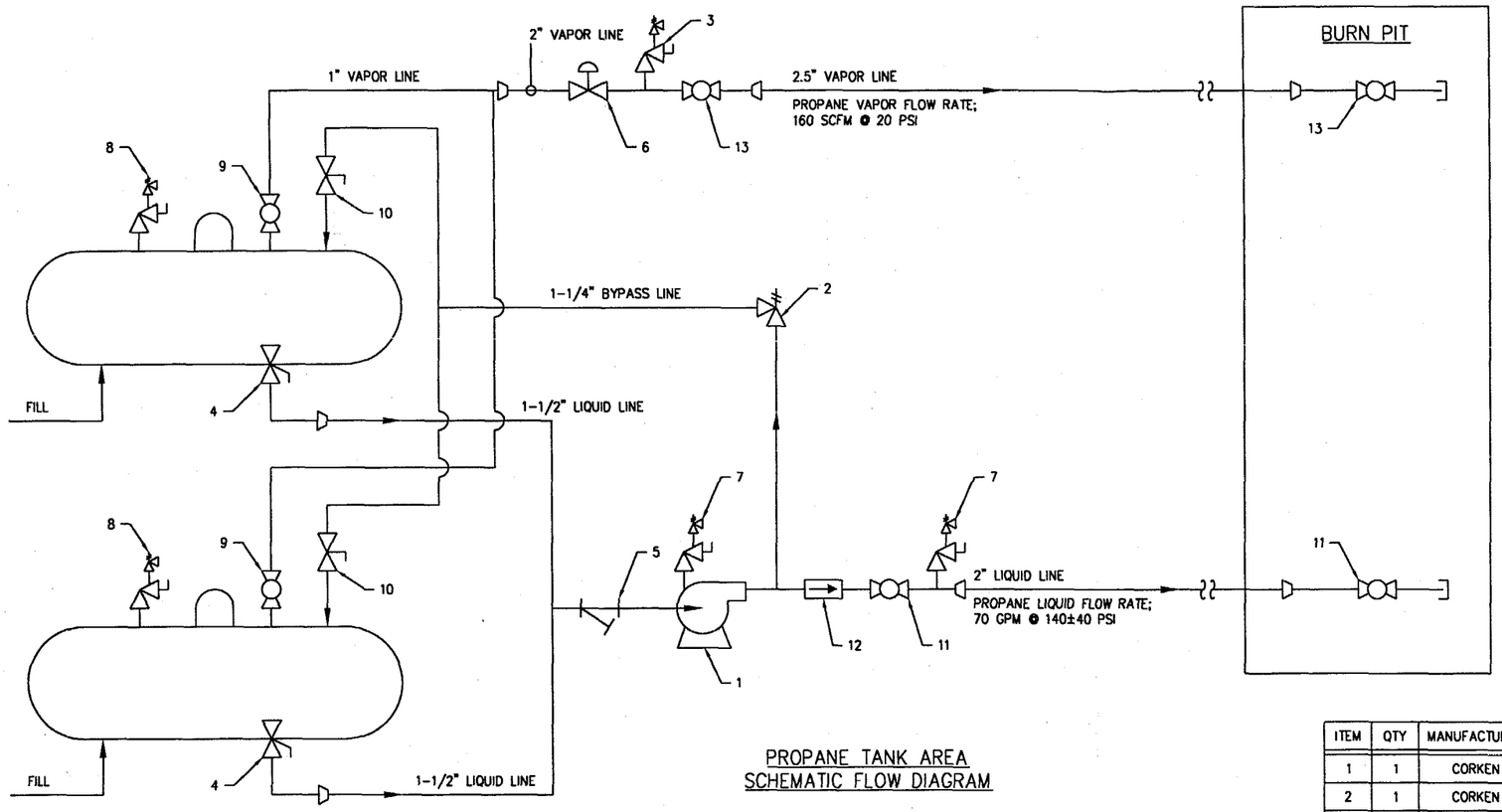
DELIVERY ORDER NO.
0022

CONSTR. CONTRACT NO.
N62470-97-D-5000

NAVFAC DRAWING NO.
--

SHEET I.D.
FIGURE 7-4

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	*Atlanta, GA.*	776506-D-7-5

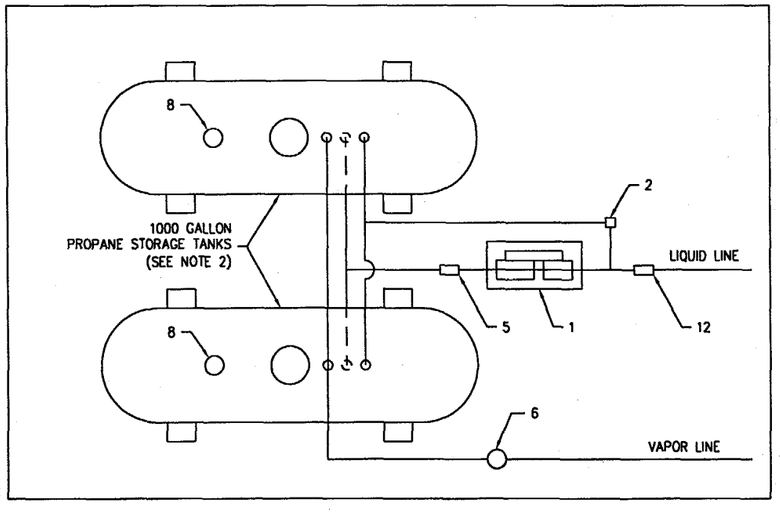


PROPANE TANK AREA
SCHEMATIC FLOW DIAGRAM

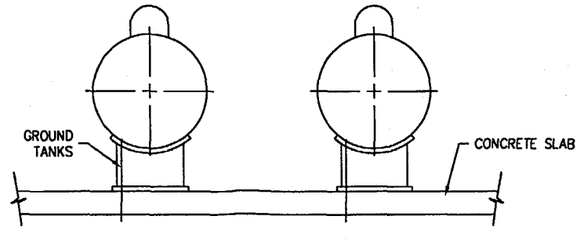
NOTES;

1. PROPANE VAPOR AND LIQUID DELIVERY COMPONENTS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH NFPA 58-STANDARD FOR THE STORAGE AND THE HANDLING OF LIQUEFIED PETROLEUM GASES, THE NATIONAL ELECTRICAL CODE, AND APPLICABLE LOCAL AND STATE ORDINANCES.
2. ALL ELECTRICAL CONDUIT WILL BE SEALED. PROPANE TANKS, FOOTINGS, AND TANK SADDLES TO BE DESIGNED AND INSTALLED TO MEET LIQUID FLOW REQUIREMENTS, NATIONAL AND LOCAL INSTALLATION STANDARDS. ALL EQUIPMENT WILL BE GROUNDED.
3. THIS IS A PROPANE SUPPLY SYSTEM DESIGN CONCEPT WITH DELIVERY REQUIREMENTS. THIS IS NOT A PROPANE SUPPLY SYSTEM DESIGN. PROPANE DESIGNER/INSTALLER TO CONFIRM SUITABILITY OF COMPONENTS OR EQUIVALENTS TO MEET FLOW REQUIREMENTS. TANKS TO BE PROVIDED WITH APPROPRIATE PORT SIZES, INTERNAL TANK VALVES AND TRIM.
4. PRESSURE TEST LIQUID DELIVERY LINE AT 500 PSIG; VAPOR LINE AT 500 PSIG.
5. ALL SAFETY RELIEFS WILL BE VENTED A MINIMUM OF 20 FEET ABOVE THE GROUND PER SYSTEM.

ITEM	QTY	MANUFACTURER	MODEL NUMBER	DESCRIPTION
1	1	CORKEN	521	PUMP, LIQUID PROPANE, 5 HP, 70 GPM, 780 RPM @ 40 PSI (DIFFERENTIAL)
2	1	CORKEN	T166	VALVE, BY-PASS, 1-1/4" NPT
3	1	FISHER	1805-13	VALVE, SAFETY RELIEF, ADJUSTABLE (10-60 PSIG)
4	2	FISHER	C427	INTERNAL TANK VALVE, 100 GPM CLOSING, W/MANUAL SHUT-OFF,2" NPT
5	1	PAGET	PG125B	STRAINER, 2" NPT
6	1	FISHER	99 SERIES	REGULATOR, VAPOR PRESSURE, 10-25 PSIG, 2" FNPT
7	2	REGO	3129P	VALVE, HYDROSTATIC, 300 PSIG
8	2	FISHER	H5110-265	VAVLE, SAFETY RELIEF, 265 PSIG
9	2	WORCHESTER	1"5946TTSE	VALVE, BALL, 1" NPT, ANSI 600
10	2	WORCHESTER	1-1/4"5946TTSE	VALVE, BALL, 1-1/4" NPT, ANSI 600
11	2	WORCHESTER	1-1/2"5946TTSE	VALVE, BALL, 1-1/2", ANSI 600
12	1	CORKEN	FC150	VALVE, CHECK, 1-1/2" NPT
13	2	WORCHESTER	2"5946TTSE	VALVE, BALL, 2" NPT, ANSI 600



PROPANE TANK AREA PLAN VIEW



PROPANE TANK SUPPORT
DETAIL

SOURCE: INFORMATION FROM SYMTRON SYSTEMS INC. DATED MARCH 31, 1999.

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

REVISIONS

REV	DATE	BY	CHK'D/APRV'D	DESCRIPTION/ISSUE

OHM Remediation Services Corp.
PROJECT NO. 776506

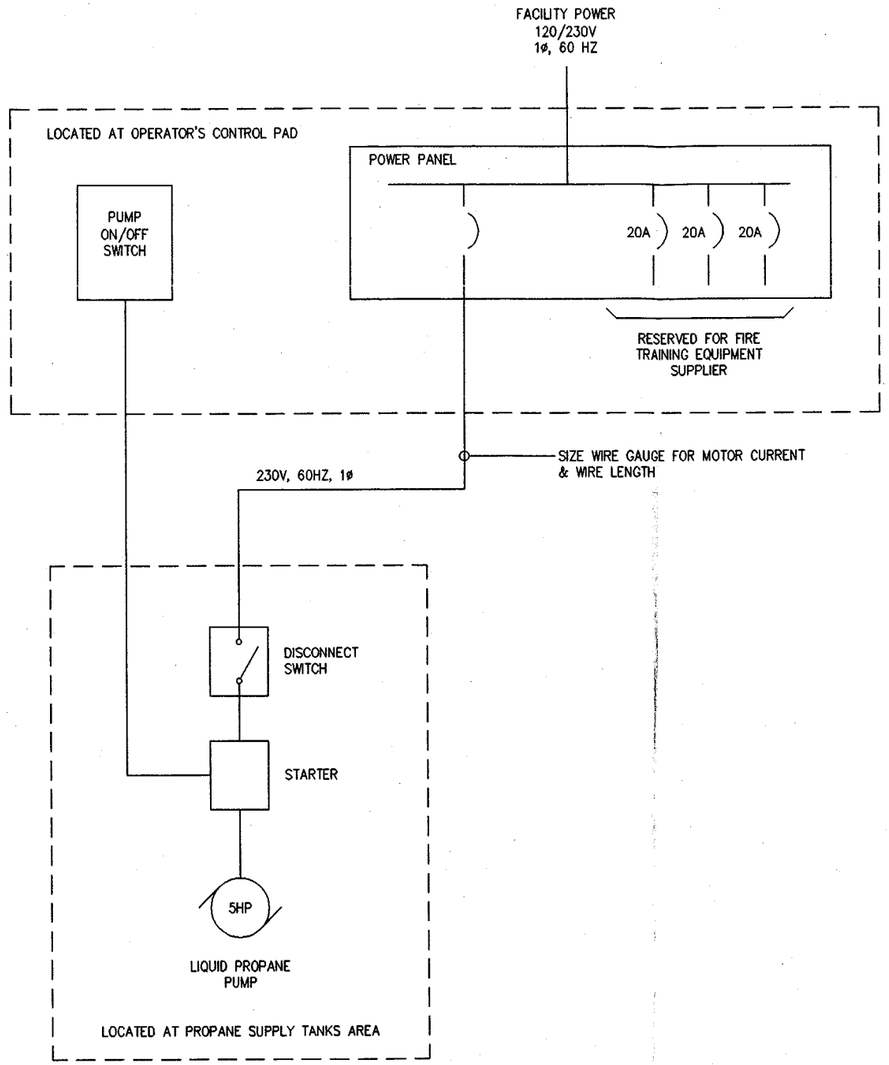
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	J. Longo		

DEPARTMENT OF THE NAVY
NAVAL STATION
MARINE CORP BASE
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
ATLANTIC DIVISION
CAMP LEJEUNE, N.C.

BURN PITS 9 AND 54

SITE 54 - OSPREY FIRE TRAINER

SCALE:	SIZE: D
DELIVERY ORDER NO. 0022	
CONSTR. CONTRACT NO. N62470-97-D-5000	
NAVFAC DRAWING NO. -	
SHEET I.D. FIGURE 7-5	



ONE LINE DIAGRAM

SOURCE: INFORMATION FROM SYMTRON SYSTEMS INC. DATED MARCH 31, 1999.

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	*Atlanta, GA.*	776506-D-7-6

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

REV	DATE	BY	CHK'D/APR'VD	DESCRIPTION/ISSUE

REVISIONS

OHM Remediation Services Corp.
PROJECT NO. 776506

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	J. Lange		

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
NAVAL STATION
ATLANTIC DIVISION
MARINE CORP BASE
CAMP LEJEUNE, N.C.

BURN PITS 9 AND 54

SITE 54 - OSPREY FIRE TRAINER

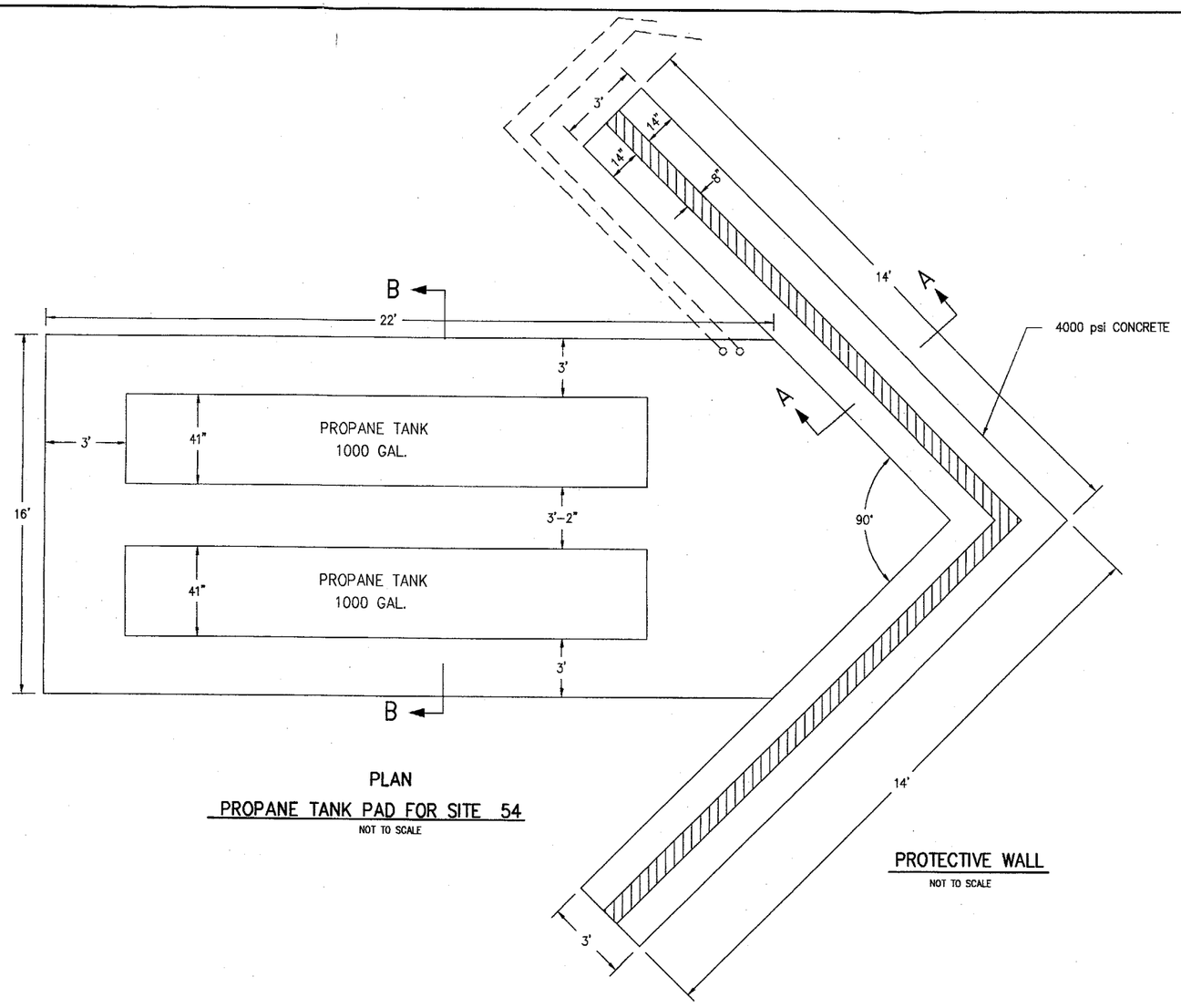
SCALE:
SIZE: D

DELIVERY ORDER NO.
0022

CONSTR. CONTRACT NO.
N62470-97-D-5000

NAVFAC DRAWING NO.
-

SHEET I.D.
FIGURE 7-6



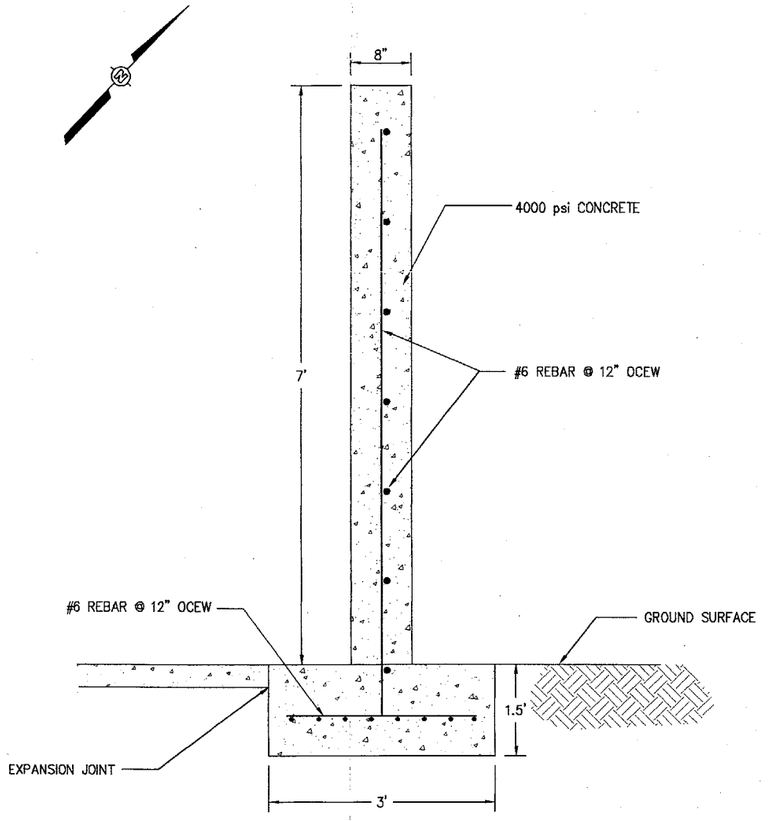
PLAN

PROPANE TANK PAD FOR SITE 54

NOT TO SCALE

PROTECTIVE WALL

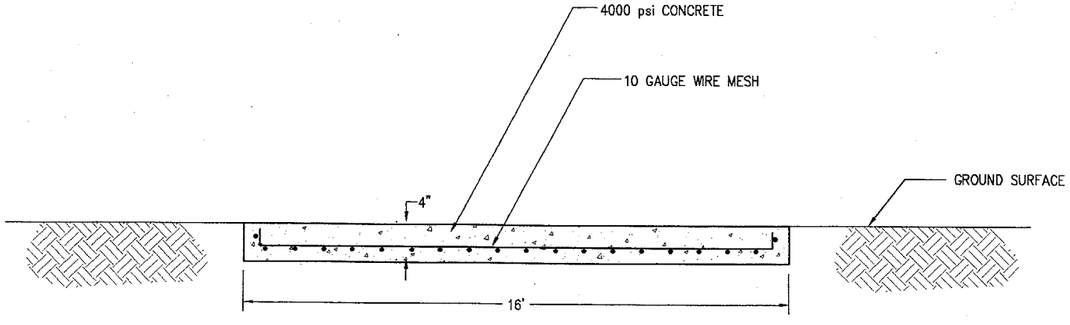
NOT TO SCALE



SECTION A–A

PROTECTIVE WALL CROSS SECTION VIEW

NOT TO SCALE



SECTION B–B

PROPANE TANK PAD CROSS SECTION VIEW

NOT TO SCALE

IMAGE	X-REF	OFFICE	DRAWING NUMBER
---	---	Atlanta, GA.	776506-D-7-12

PLOT DATE: 01/27/00
FORMAT REVISION 3/25/99

REV	DATE	BY	CHK'D	APP'VD	DESCRIPTION/ISSUE

REVISIONS

OHM Remediation Services Corp.
PROJECT NO. 776506

CHECKED BY
APPROVED BY
DESIGNED BY
DRAWN BY J. Lange

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
ATLANTIC DIVISION
NAVAL STATION
CAMP LEJEUNE, N.C.
MARINE CORP BASE

BURN PITS 9 AND 54

SITE 54 PROPANE TANK PAD AND PROTECTIVE WALL

SCALE: AS SHOWN
SIZE: D
DELIVERY ORDER NO. 0022
CONSTR. CONTRACT NO. N62470-97-D-5000
NAVFAC DRAWING NO. –
SHEET I.D.
FIGURE 7-9